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RISKS AND REWARDS

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Behavioral Finance

by Douglas A. George

My actuarial training and work experience have provided me with broad exposure to the Efficient Markets Hypothesis (EMH). Some fundamental premises of EMH are that market prices reflect all available information; that prices move in a random manner, with no discernable pattern or trend; and that investors act in a completely rational manner, always maximizing expected utility.

The implications are significant. If markets are truly efficient, then attempting to outperform them is futile. For example, any information you have which may cause you to believe a given security's price will move up or down, is already completely and fairly reflected in the current price of the security. Thus, attempting to outperform the market is a game of chance rather than skill.

However, some observers argue that the empirical data do not support the Efficient Markets Hypothesis. They claim that there are anomalies in price movements that cannot be explained through EMH. Because of these perceived shortcomings, a new approach to explaining financial markets has recently emerged known as behavioral finance.

What is Behavioral Finance?

Behavioral finance does not attempt to supplement standard finance; it attempts to replace it. It presents a financial paradigm in which some agents do not act in a rational manner. It is based on the observance of ways in which people systematically depart from optimal judgment and decision-making. It links behavioral cognitive psychology (the study of human decision making) with financial market economics, emphasizing how investor behavior leads to various market anomalies. It takes into account human emotion and cognitive error in explaining how investors make financial decisions. It argues that these behaviors cause departures from rational decision-making, that these departures are systematic and that they affect prices in the financial markets.

If true, behavioral finance offers tremendous potential value to our profession. An understanding of why we make investment decisions the way we do, and the flaws that we have, can lead to better decisions on behalf of our employers and clients. Further, to the extent that the flaws discovered through this analysis are consistent and predictable in the markets, they would offer investment opportunities that can be exploited[1].

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1) Studies supporting behavioral finance focus on equity markets. Some parallels may exist in debt markets, especially lower quality debt, which tends to behave more like equity.

Inside...

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Letter to the Editor

Dear Editor:

The article "Are We In A Different Market Paradigm?" in the July 2003 *Risks and Rewards* contains a statement that needs a challenge. On page 20, two sentences state: "The inflationary experience of the last 50 years has not been the norm. Prior to the second world war persistent inflation was unheard of."

I cannot easily lay my hands on it, but I recall a longer article—perhaps in the 1980s—that found that in every civilization that used coins or currency, inflation has been the norm, with the singular exception of England during the centuries from the defeat of the Spanish Armada (1588) until the start of World War I (1914).

For instance: Coins would be minted at a specific weight and value. Cheaters would slice edges (of silver, *e.g.*) off the coin, then pass it on to the next holder at the nominal value. All U.S. dimes, quarters and halves have milled edges to deter this type of cheating.

The article remarked on inflation at the time of Pericles, and in the Roman and subsequent civilizations. The temptation for the executive and legislative branches of government to disburse more value than they are willing to collect by taxes is apparently universal and hard to resist. Everybody does it.

The article to which I refer did not speculate much on why England did not have inflation during those three centuries. Very important to the genesis of actuarial science is that a stable currency and fairly stable interest rates endured over those 326 years. Perhaps the onset of the industrial revolution provided enough in productivity gains to offset the apparent innate urge of government to expand. Perhaps the English parliament was more concerned with restraining the activities of their (sometimes foreign-born) kings than with growing their own power.

The American colonies that won their independence from Britain in 1776-1783 may have inherited a culture that was favorable to a stable currency. The U.S. experience since 1946 suggests that we no longer possess that culture. Motel 6 was originally so named because a room for one cost $6 per night. At the time, the minimum wage was $1 per hour. Today the Federal minimum wage is $5.15, and the California minimum wage is $6.50. Not surprisingly, Motel 6 in California advertises rates of $39 or more per night. Other factors beside minimum wages influence inflation, but the culture in which the governmental bodies operate dominates.

Wilbur M. Bolton, FSA

Editor's Note: According to the Economic History Services Web site at www.EH.net, *U.K. inflation in the 1600s averaged 0.5 percent per year; in the 1700s, 0.4 percent per year; in the 1800s, -0.2 percent per year and in the 1900s, 4.2 percent per year. CPI patterns in the U.S. were similar. Mr. Bolton can be contacted at his SOA Directory address.*

Financial Economics for Pension Plans

by Richard Q. Wendt

Participants at the recent Great Pension Controversy Symposium in Vancouver spent two days discussing the concepts of financial economics as applied to pension plans. Since then, many of my actuarial colleagues who did not attend have asked, "Exactly what is financial economics and what does it have to do with pension plans?"

The Actuarial Foundation's textbook on financial economics tells us, ". . . the field of financial economics has built on the Nobel Prize-winning works of Markowitz, Merton, Miller, Sharpe and Scholes. Their work spawned an entire field of formal treatment of investment management and asset and derivative pricing." Consideration of risk is the tenet of financial economics.

The recent paper by Jeremy Gold and Larry Bader, "Reinventing Pension Actuarial Science," evaluated pension finance in the light of financial economics, particularly focusing on the necessity for considering risk in valuing liabilities. Their seminal paper set the stage for the Vancouver symposium. Although there were some pockets of resistance, most of the symposium attendees supported the general concepts of financial economics, at least in this writer's opinion.

The majority of symposium presenters agreed on three fundamental principles:

- Pension liabilities are "bond-like."
- Pension liabilities should be valued at discount rates derived from bond yields.
- Asset/liability relationships are critical elements of pension plan financing.

On the other hand, presenters differed on a key proposition—that pension funds should *invest* primarily in bonds. If that proposition should suddenly take hold, there could be dramatic changes in pension investments, corporate finance, stock and bond markets and even the overall economy. Perhaps for the better, perhaps not.

When prior financial theories have been put forth (e.g., modern portfolio theory), financial managers generally had a choice of either implementing or ignoring the theory, depending on their own analysis and preference. If a financial manager thought that the particular theory provided some advantage, she could have voluntarily chosen to implement the theory. Independent actions by market participants typically occur over medium to long time horizons and generally have little noticeable market impact in the short term.

Yet, new funding or accounting requirements could impose financial economics principles on pension plans in one fell swoop. With corporate and governmental defined benefit (DB) pension plans accounting for approximately $ 2 trillion of assets, a wholesale shift in investment strategy or risk tolerance could have a significant impact on equity and fixed income markets.

"The Law of Unintended Consequences" is what can happen when we plan carefully, but fall so much in love with our plans (and usually with what we are convinced is our superior knowledge and wisdom) that we fail to ask the tough questions that could save us from potential backlash and even disaster. When we become so sure that we're right, we may neglect to ask, "OK, we think we've got this figured out and that we've covered all the bases. Now what have we forgotten?" (Stewart Stokes; *Merrimack River Current*, April 24, 2003; www.townonline.com)

What could go wrong with implementing financial economics?

Although DB pension plans could be considered risk-tolerant, long-term investors, valuing pension liabilities as if they were bonds (and charging operations on an immediate basis for any gains or losses) will likely cause pension plans to become risk averse, short-term investors.

The result of such a change in emphasis would likely be an increase in the cost of DB pension plans. That, in turn, would likely cause an accelerated shift from DB plans to defined contribution (DC) plans, as plan sponsors try to control cost and risk exposure. Of course, DC plans also require continuing contributions. But since the full investment risk is transferred to participants, the plan sponsor's contributions for a DC plan are stable and predictable. On the other side of the coin, DC plan participants will likely invest in equities and expect equity-like returns to fund their retirement.

What would happen if DC plans should have adverse financial experience? In that case, many participants might need to defer retirement. This too has a potential cost for participants and employers that should not be ignored. After all, pension plans were created to allow employees to leave the workforce in a predictable and orderly way.

Notice that this scenario includes some major investment transitions—from today's equity-oriented pension plan strategies to bond-oriented plan strategies and then back to equity-oriented strategies for the DC participants.

Thus, it could all come full cycle. By ignoring the natural ability of most DB pension plans to absorb short-term risk, financial economics could end up shifting risk to the parties least able to bear it—the participants. The adverse effects could eventually flow back to the employer—to the detriment of all parties.

Financial economics may promote some helpful new thinking processes for pension plans, but a sudden change in financial practices, without a full analysis of potential outcomes, could hold some unintended consequences.

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On the other side of the house, can we use behavioral finance to better understand our customers/policyholders? If so, we could design products and features that are more appealing to them and increase our profitability. Many of the behavioral models we currently use in our risk analyses assume that policyholders act in a truly rational manner, exercising options to maximize their economic benefit. How many of us believe that they really act in this manner?

The Observations

Behavioral finance has observed and studied dozens of investor behaviors that present potential anomalies to the Efficient Markets Hypothesis. Here are a few:

Overconfidence: A number of studies show that people are overconfident in their judgments. For example, the confidence intervals that people place on their estimates are too broad. One study showed that the 98 percent confidence intervals placed on predications for the Dow at the year-end include the correct value only 60 percent of the time [Alpert and Raiffa (1982)]. Another showed that events that people think are virtually certain occur only 80 percent of the time, and others that are predicted to be impossible occur 20 percent of the time [Fischhoff, Slovic and Lichtenstein (1977)]. Overconfidence can lead to poor investment decisions. Think: Orange County, Long Term Capital, Confederation Life, Conseco….

Self-Attribution Bias (a.k.a. Accumulating Pride and Shunning Regret) is related to, and possibly a cause of, overconfidence. It refers to the tendency to attribute any success a person has to his own talent (i.e. "accumulating pride"), while attributing failure to bad luck or victimization (*i.e.* "shunning regret"—Regret is the pain we feel when we realize we would have been better off if we had not taken a course of action in the past). Behaviorists believe that markets are driven, not by greed and fear, but by the desire to accumulate pride and shun regret. One study showed investors can become overconfident due to the self-attribution bias after only a few periods of successful investing [Gervais and Odean (2001)].

Investors tend to sell winners too soon (to achieve pride) and hold on to losers too long (to avoid regret).

Accumulating pride and shunning regret can be good for people in general because it motivates them to keep trying after a failure, but it is not necessarily good for investors. Investors tend to sell winners too soon (to achieve pride) and hold on to losers too long (to avoid regret). They seem to want to believe that their losers will bounce back, perhaps when the rest of the market realizes what they "know." In addition, overconfidence prompts people to trade too often, believing they have some advantage over the market. [Barber, Odean (1999)]. Think: Day traders.

Gender also plays a role. One study has found that men trade 45 percent more than women and perform 1.4 percent worse annually [Barber, Odean]. Why? Men are more overconfident than women.

Optimism/Wishful Thinking: Over 90 percent of people surveyed believe they are above average in their driving skills, their ability to get along with people and in their sense of humor [Weinstein (1980)]. They also predict that tasks will be completed much sooner than they actually are [Buehler, Griffin and Ross (1994)]. Think: How often do your staff members perform a task in less time than they tell you it will take? How often does it take longer?

Sample Size Neglect: When people do not know the data-generating process, they will infer it too quickly based on only a few data points. The belief that a small sample will reflect the properties of the overall population has been called "the law of small numbers" [Rabin (2002)].

Belief Perseverance: Once people form an opinion, they tend to stick with it too long. They do not want to look for information that might contradict their belief, and if they find any, they tend to dismiss it. [Lord, Ross and Lepper (1979)]. Think: What is the reaction when you challenge a colleague on one of his conclusions? **Confirmation Bias** goes one step further in that when people find information that opposes their conclusion, they misapply it or choose only fragments of it so that it supports their position instead.

Anchoring: When people form estimates they start with an initial value, which may have no relevance, and then adjust it to yield their answer. The adjustments are usually insufficient [Slovic and Lichtenstein (1971)]. Therefore, different starting points yield different estimates. In the markets, there is evidence that current prices can be anchored to prices in the past, so that prices do not fully adjust to certain fundamental changes. Think: A common negotiation strategy when undertaking a sale

(purchase) is to start with the highest (lowest) price and adjust from there so that you get the best price possible. For example, when you buy a car, the dealer wants to start with the sticker price and work down and you want to start with the dealer's invoice and work up.

Myopic Loss Aversion: People feel the pain of loss more than the joy of gain. Thus, they exert more effort to avoid pain than to achieve gain. Normal people hate losses roughly two and one-half times as much as they like gains. Further, if one piece of their portfolio went up and another went down, but the portfolio in total did well, they will still feel the pain of the portion that dropped [Thaler, Tversky, Kahneman and Schwartz (1997)].

Prediction Addiction: If you show people a series of anything—numbers, colors, shapes, letters—and suggest that the sequence is random, they will insist on believing they can predict the next item in the series. At least one study has shown that the tendency to find these "patterns" is so powerful, that it happens subconsciously [Zweig (2002)]. In regard to markets, "every professional thinks he can forecast where the markets are headed, but at heart, all of us know these things are essentially unpredictable." Think: How many of us do NOT have a rough prediction for market index levels at year-end?

The above-referenced article goes further to explain how evolution is responsible for many of the behaviors listed here. "The human brain is a superb machine when it comes to solving ancient problems like short-term trends or generating emotional responses with lightning speed, but it's not so good at discerning long-term patterns or focusing on many factors at once." For example, panic can be a good reaction. For prehistoric man, reacting quickly to danger was a matter of life or death, *e.g.* an attack by a wild animal. Underestimating a real risk could be deadly, while overreacting did no harm. Of course, panic is not always a good reaction. Panicking as an investor can cause you to sell at a market low.

There are many more. **Hindsight Bias** is the belief, after an event has occurred, to think that we knew it was going to happen beforehand (contributes to over-confidence). **Framing** is reaching a conclusion based on the "framework" within which a situation was presented, e.g. people are more likely to agree to a new technique if it is described as "having a 50 percent success rate," rather than "having a 50 percent failure rate." **Persuasion Effect** refers to being persuaded more by a (perceived) credible source than by a credible argument. **Illusion of Control** refers to a belief that an individual has more control over events than he really has. The list goes on.

How does it all work?

Let's take an example. It is common knowledge that the average equity investor tends to buy high and sell low. There are a number of studies that confirm this. We see this behavior in stocks, mutual funds and in our variable annuity customers. It's amazing to me how many people I know, who in early 2000, were throwing money at the stock market (with the S&P 500 at 1500), and who have pulled their money out over the last year and a half (with the S&P 500 at 800 or 900). Why?

The human brain is a superb machine when it comes to solving ancient problems like short-term trends or generating emotional responses with lightning speed...

The efficient markets hypothesis provides no clue. These actions do not appear to be rational. Certainly there is much less risk with the S&P at 900 than at 1500. If the market moves in a random walk then why not buy now, rather than sell?

Behavioral finance might offer the following explanation. The market has been bearish for the last couple of years. **Loss Aversion** causes an investor to feel the extreme pain of his losses over that time. Even if he had great years before the bear market, he feels the pain at 2.5 times the enjoyment of the previous gain. He regrets the decision to stay in the market, but shuns it. If only he hadn't listened to his stockbroker (or his financial advisor or his brother-in-law).

Prediction Addiction causes an investor to believe that stocks will continue to drop. He sees a short-term historical pattern and projects it forward even though there is no logical basis for doing so. He believes stocks will continue to fall. **Loss Aversion** reemphasizes this belief because he imagines the market dropping another 10 percent, another 20 percent—he desperately wants to avoid further pain. **Overconfidence** kicks in. He knows he can fix it. He sells his mutual funds and surrenders his annuity.

He's out of the market until the market shows him that it is going back up, *i.e.*, after it's risen enough over a given time period (he needs to see the

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new pattern—the **Prediction Addiction**). Of course, by this time, he will have missed a good portion of the new bull market.

Where next ?

Can we use behavioral finance to better understand how we make investment decisions so that we can make them better? Can we spot situations in the market where one of the anomalies is at play and then exploit it? Can we better understand, and better model, the behaviors of our customers/investors/policyholders to our advantage? The jury is still out.

At least one researcher claims there is evidence to show that investor overreaction to information (e.g., prices moving too much) can be as common as under-reaction (*e.g.* prices moving too little). [Fama (1997). Note: Fama is largely credited with the development and rise in popularity of EMH in the 1960s]. If this is true, then the anomalies can be considered to be simply chance events, and the efficient markets hypothesis cannot be rejected. Fama also argues that the apparent anomalies can disappear when the measuring techniques change.

But—behavioral finance is in its infancy. Arguably, it was born only about 20 years ago, with a good deal of the progress made over only the last few years. It's hard to say where it goes from here. It certainly cannot currently claim to replace the Efficient Markets Hypothesis, but if current momentum continues, the possibility exists.

Special Thanks

Douglas A. George, FSA, MAAA, is senior vice president and actuary at Aon Consulting in Avon, Conn., and is chairperson of the Investment Section. He can be reached at Douglas_A_George@aoncons.com.

This is my last column as chair of the Investment Section for 2003. I owe a debt of gratitude to a number of people who have helped with the all of the work performed by the section over the course of the year. The Investment Section Council has performed admirably, with each member pitching in to share in the workload. They are: Mark Bursinger, Craig Fowler, Charles Gilbert, Larry Rubin, Steve Easson, Mike O'Conner, Joe Koltisko and Bryan Boudreau. There are roughly 40 "roles" required of our council, including: seminar coordination; SOA meeting session planning; research project oversight; liaison, committee and task force delegates; and officer positions. I am lucky to have nine conscientious council members, each doing his part.

In addition, I need to thank Valentina Isakina, our SOA staff actuary, and Lois Chinnock, our SOA staff liaison. I'd be lost without both of you. Finally, thanks to our *Risk & Rewards* editors, Dick Wendt, Nino Boezio and Joe Koltisko for yet another successful year for our newsletter. ■

References

Alpert, M., and H. Raiffa. 1982. "A Progress Report on the Training of Probability Assessors," in: J*udgment Under Uncertainty: Heuristics and Biases* edited by D. Kahneman, P. Slovic, and A. Tversky, (Cambridge) Cambridge University Press, Cambridge) pp. 294-305.

Barber, B., and T. Odean. 1999. "The Courage of Misguided Convictions: The Trading Behavior of Individual Investors." University of California, Davis.

Barberis, N., and R. Thaler (2003), "A Survey of Behavioral Finance" (University of Chicago).

Buehler, R., D. Griffin, and M. Ross. 1994. "Exploring the Planning Fallacy: Why People Underestimate Their Task Completion Times," *Journality of Personality and Social Psychology* 67: 366-381.

Fama, E. 1997. "Market Efficiency, Long-Term Returns and Behavioral Finance." (University of Chicago).

Fischhoff, B., P. Slovic, and S. Lichtenstein. 1977. "Knowing with Certainty: The Appropriateness of Extreme Confidence," *Journal of Experimental Pyschology: Human Perception and Performance* 3: 552-564.

Fisher, K., and M. Statman. 2000. "Cognitive Biases in Market Forecasts," *Journal of Portfolio Management:* Fall 2000: 72-81.

Gervais, S., and T. Odean. 2001. "Learning to be Overconfident," *Review of Financial Studies* 14: 1-27.

Gilboa, I., and D. Schmeidler. 1989. "Maxmin Expected Utility with a Non-Unique Prior," *Journal of Mathematical Economics* 18: 141-153.

Lord, C., L. Ross, and M. Lepper. 1979. "Biased Assimilation and Attitude Polarization: The Effects of Prior Theories on Subsequently Considered Evidence," *Journal of Personality and Social Psychology* 37: 2098-2109.

Rabin, M. 2002. "Inference by Believers in the Law of Small Numbers," *Quarterly Journal of Economics* 117: 775-816.

Stracca, L. 2002. "Behavioral Finance and Aggregate Market Behavior: Where do We Stand?" European Central Bank.

Thaler, R., A. Tvversky, D. Kahneman and A. Schwartz. 1997. "The Effect of Myopia and Loss Aversion on Risk-Taking: An Experimental Test," *Quarterly Journal of Economics* 112: 647-661.

Zweig, J. 2002. "Are You Wired for Wealth?" *Money* (October): 76-83.

Redington Prize Awarded to Luke Girard

To promote investment research, the Investment Section sponsors a biennial prize of $2000 (U.S.) for the best paper on an investment-related topic written by a SOA member. The prize is named after F. M. Redington, the eminent British actuary who coined the term "immunization" in a 1952 paper that was published in the *Journal of the Institute of Actuaries.* This is the seventh award since the prize was first established.

A number of fine papers were nominated this year for consideration for the Redington Prize, papers which were published over the period 2000-2001. Some of the parameters that govern the Redington Prize Award are as follows:

- The topic must be judged to be timely, primarily of investment nature and of substantial value to SOA members.

- The selection criteria will include factors such as, investment content, originality, practical significance, timeliness, relevance and educational value to the membership.

The prize committee received a total of 15 nominations. The council would like to thank all those who took the time to send in nominations. Many worthy papers were submitted, and therefore, the committee's decision was not an easy one. For the 2000-2001 publication period, the prize has been awarded to Luke N. Girard, FSA, who wrote "Market Value Of Insurance Liabilities: Reconciling The Actuarial Appraisal And Option Pricing Methods." The article was published in the January 2000 issue of the *North American Actuarial Journal (volume 4, number 1).*

The paper provides useful insights into the important area of financial reporting. Girard explores the mathematical and pricing implications on insurance liabilities of adopting various pricing paradigms, and identifies conditions that will insure convergence to actively traded securities. The debate over the fair valuation of liabilities has been intensifying, making this paper even more relevant today.

The prize committee also wishes to make honorable mention of the following paper by Mary Hardy, FSA, "A Regime Switching Model of Long-Term Stock Returns," which appeared in the April 2001 issue of the *NAAJ (volume 5, number 2).*

Even though this paper was not awarded the Redington Prize, the prize committee ranked it highly in its review. Ms. Hardy addresses the non-normality ('fat tails') in historical data. She presents an appealing and credible modification of the normal model, discusses how many 'regimes' are enough, and shows to what extent such theory fits historical data.

On behalf of the Investment Section, the council would like to congratulate Mr. Girard, and thank and acknowledge Mr. Girard and Ms. Hardy for the exceptional work they have contributed to the profession. The council also expresses its gratitude to the members of the prize committee in the final selection process. The prize committee consists of Nino Boezio, Paul Donahue, Steven Easson, Jeremy Gold, John Manistre, Robert Reitano, Michael Sherris, Elias Shiu, Ken Seng Tan, Richard Wendt and Yong Yao.

The next Redington Prize will be awarded in 2005 for papers published in 2002-03.

A Depositor Run in Securities Markets:

The Korean Experience

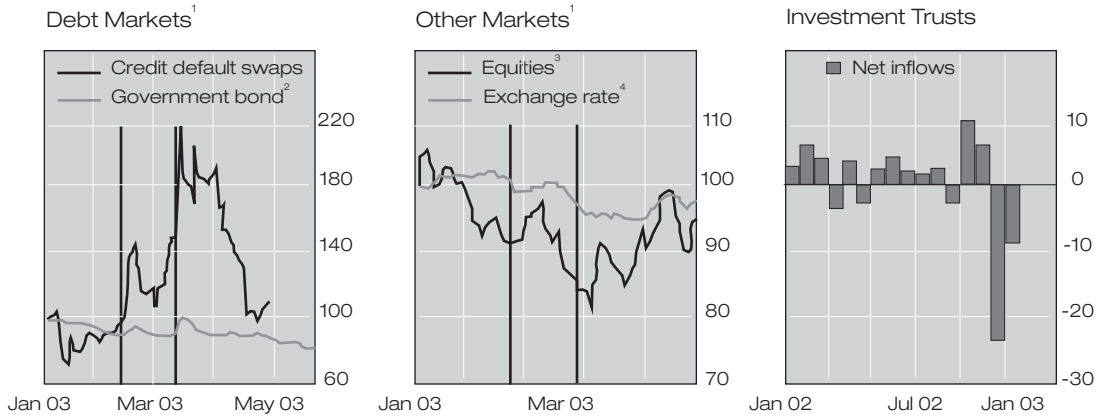
Editor's Note: This article is reprinted with permission. It last ran in the Bank for International Settlement Quarterly Review in June 2003.

Comments from Thomas P. Edwalds, leader of EVM subgroup: The Extreme Value Models (EVM) subgroup of the Society of Actuaries Risk Management Task Force has compiled lists of events which could "never happen," at least according to common wisdom. But some of them did happen, and the others can not be ruled out scientifically. The EVM subgroup is currently sponsoring a contest to encourage actuaries to write discussions of approaches which could be taken to prevent financial ruin from this kind of risk exposure. This article provides an example of such an event that happened earlier this year: a "run on the bank" by investors trust funds in South Korea. The article also describes the actions the South Korean government took to prevent a complete economic meltdown in the wake of this event.

While financial systems dominated by banks are frequently contrasted with systems centred around securities markets, similarities between the two types of system receive less attention. Events in Korean financial markets in March 2003 highlighted one of those similarities: the risks to financial stability posed by a run by investors. Central banks have long been concerned about the possibly systemic consequences of a sudden withdrawal of deposits from banks and have developed tools, such as deposit insurance and lender of last resort facilities, to respond to bank runs. Korea demonstrated that similar runs can occur in securities markets, in the form of mass redemptions of trust funds. The tools for responding to such runs, however, are much less developed.

The problems in Korea began on March 11, when state prosecutors indicted executives of SK Global, a subsidiary of Korea's third largest conglomerate SK Group, on charges of falsifying financial statements. SK Global was accused of inflating profits by 1.6 trillion won and hiding debt totalling 1.1 trillion won. Similar to the market reaction a month earlier—on 11 February when concerns about North Korea's nuclear weapons programmed had led Moody's to change its credit rating outlook on South Korea to negative from positive—equity, fixed income and currency markets all fell immediately after the indictment. However, whereas in February markets had stabilised quickly, in March liquidity problems among non-bank financial intermediaries led to a vicious circle of deterioration in market functioning.

In the days and weeks following the indictment, Korean investors fearing losses redeemed their holdings of investment trusts, especially money market funds. Redemptions in March totalled 24.7 trillion won, or 14 percent of trusts' assets at the end of



[1] January 1, 2003 = 100; vertical lines indicate February 11, 2003 and March 11, 2003.

[2] Five-year Korean won-denominated bond yield.

[3] KOSPI.

[4] U.S. dollar/won exchange rate; a decline indicates a depreciation of the won.

[5] Change in deposits with Korean investment trust management companies, in trillions of won.

Sources: Bank of Korea; Bloomberg; CreditTrade; Datastream; BIS calculations.

February. Given their limited cash holdings and restrictions on borrowing, investment trusts were forced to meet redemptions by selling assets. As a result, corporate and even government bond prices plummeted. Credit default swap (CDS) spreads on the Korean government also soared as liquidity in other segments of the debt market evaporated and investors turned to the CDS market to hedge their exposures. In the face of such distress selling, financing conditions in Korea's corporate bond market deteriorated to the point where the solvency of some financial institutions was threatened. Credit card companies were the worst affected because of their heavy reliance on investment trusts for funding. Rising delinquency rates had already begun to put upward pressure on card companies' borrowing costs, and as trusts liquidated their assets, card companies faced the prospect of being unable to roll over maturing obligations.

The authorities eventually intervened to ensure that markets continued to function. In mid-March, the central bank helped to stabilise the government debt market by bidding for 2 trillion won, and the government postponed scheduled auctions of government bonds. To avert the possibly systemic consequences of a default by a card company, the Korean authorities brought together a number of key market participants to arrange an orderly refinancing of card companies' maturing debt. In early April, commercial banks agreed to provide a line of credit, and in exchange the card companies committed to raising 4.6 trillion won in equity capital.

Thomas P. Edwalds, FSA, MAAA, is an assistant vice president of Mortality Research at Munich American Reassurance Company in Chicago, Ill. He can be reached at tedwalds@marclife.com.

Congratulations To New Section Council Members!

The following are newly-elected members of the Investment Section Council. They will each serve a three-year term beginning in October, 2003.

Sean Patrick Casey
Lehman Brothers
New York, N.Y.

Martin K. le Roux
ING Institutional Markets
Denver, Colo.

Stephen J. Stone
Allstate Insurance Company
Northbrook, Ill.

THANK YOU!

With appreciation to 2003-2003 outgoing council members:

Douglas A. George
Aon Consulting
Avon, Conn.

Craig Fowler
Maritime Life Assurance Company
Halifax, Nova Scotia

Charles L. Gilbert
Tillinghast-Towers Perrin
Toronto, Ontario

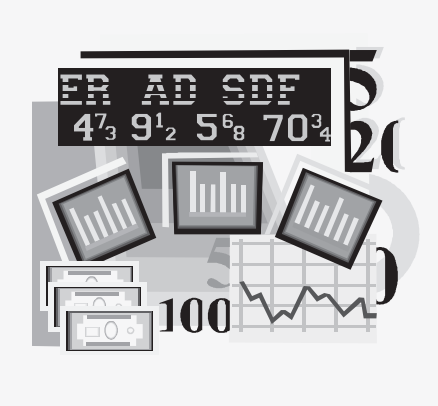
Why Write Variable Products When You Can Put the Money Directly into the Stock Market?

by David N. Ingram and Stuart H. Silverman

For all our financial sophistication, we all need to find ways to bring our decisions down to earth sometimes. That is very difficult to do when comparing choices that have very different timing and cash-flow intensity. It is even more difficult when those cash flows have different levels of risk. But it is possible to develop a process for comparing complex insurance products to simple everyday investment choices that can help to guide our decisions. After all, insurance products do not exist in a vacuum.

Most pricing actuaries involved in setting profit targets for variable annuity contracts have experienced the queasy feeling that comes with having no firm place on which to plant their feet. Variable annuities seemed to have little net investment by the insurance company so the standards of returns based on ROE or ROI calculations did not always produce a usable result. Sometimes return on asset targets were substituted as profit markers. What do you do when there is a real change in the product that starts to produce risk? Additional risk should mean additional return, but how much is the right amount? And also, was the risk premium in the original product appropriate?

What is needed is a way to anchor those sorts of decisions to the ground in some manner. One way to accomplish that would be to make a comparison to a realistic alternate investment that has similar risk characteristics. In the case of the variable annuity contract, almost all of the risk comes from the stock market. The amount of M&E charges collected depends directly on stock market performance. GMDB risk is heavily dependent upon stock market performance as well. So what if you looked at the choice of either directly investing in the stock market or investing capital in underwriting a block of variable annuities? For example, assume that the variable annuity contracts have initial premiums of $100 million and initial surplus strain of $10 million. An alternative is that the $10 million could be invested in a mutual fund, whose assets are invested in the same manner as variable annuity accounts.



As one might suspect, there is a comparability issue between the two choices. The capital invested in the variable annuity changes each time there is a contract surrender or death. In order to make the pattern of investment over time of the two choices comparable, the mutual fund investments' yearly cash flows are determined as the investment gain plus the recapture of some of the principal. Principal is recaptured in a manner consistent with the variable annuity decrements (lapses and mortality rates). Furthermore, the mutual fund investments are assumed to be invested in the same funds as the variable annuity account values with the same investment management fees deducted from the market returns.

To satisfy the basic economic dictum of greater reward for greater risk, the variable annuity should return at least as much as the alternative investments for the same level of risk. Another way of looking at it would be the risk associated with the variable annuity must be less than the alternative investments for a given level of return. Otherwise, an investment in writing the variable annuity contract would fall below the efficient frontier.

Well, how do we define risk? While that is a question many people are struggling with, this article defines three risk measures: standard deviations of present value of profits, Contingent Tail Expectations (CTE), and percentage of scenarios where the variable annuity investment returns are less than the other investments.' The percentages are divided into four quartiles of scenarios, which were based on cumulative market returns over the surrender charge period.

Assumptions

- We developed 1000 fund growth rate scenarios over a twenty-year projection period. The geometric average growth rate (before reduction of charges) was 8 percent.

- For comparison purposes, we assumed principal is withdrawn from the alternative investments in a manner consistent with the variable annuity capital released. Thus, the amounts invested in the alternative investments are similar to the investment in the variable annuity business.

- We assume each year's earnings on the alternative investment are released.
- We discounted profits released at the risk free rate (*i.e.*, 3 percent).

- To refine our comparison, we found that it was necessary to adjust the risk level of the mutual fund. We did this by mixing in various levels of "risk-free" assets. The risk free asset is assumed to earn a level 3 percent and the mixed stock/risk free portfolio returns are discounted at the risk-free rate.

- The expenses for the variable annuity are truly marginal expenses. It is not our intention to suggest that pricing should reflect only marginal expenses, but the comparisons that we make are most valid for calculations reflecting only marginal expenses.

Caveats

- The analysis below only accounts for variability in market returns. It does not account for the additional business risk associated with variable annuities (i.e., lapse and mortality experience different from pricing, higher expenses than expected, or difference in liquidity between writing variable annuities and the alternative investments).

- The results below are not general in nature; they arise from the particular assumptions and product specifications we assumed for this article. The results are for illustrative purposes only. Other assumptions and product specifications would produce different results.

Results

As you may imagine, results are heavily dependent on the variable annuity pricing assumptions. For a moment let's assume the variable annuity with return of premium GMDB is priced assuming 150 bps of gross margins earned by the company (i.e., net of investment management fees but gross of incurred expenses and GMDB claims). The results are shown in Table 1.

Under the 150 bps gross margin scenario, the variable annuity seems to be the better choice. Your expected return is better than the alternative investments and there is less tail risk (CTE90) than investing in the 100 percent stock fund. However, the higher standard deviation of profits for the variable annuity may cause greater fluctuations in earnings than other investments. Moreover, it is possible to derive an alternative investment with expected profits equal to the variable annuity, but the company would need to borrow money to invest in the stock

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Table 1 (Dollar values are in thousands)

	Variable Annuity (150 bps)	100% Stock Fund	48% Stock Fund, 52% Risk Free Asset	108% Stock Fund, -8% Risk Free Asset (borrowed)	127% Stock Fund, -27% Risk Free Asset (borrowed)
Average NPV Profits	$5,391	$4,237	$2,050	$4,558	$5,391
Std Dev	$4,649	$4,322	$2,091	$4,649	$5,498
CTE90	($1,513)	($3,127)	($1,513)	($3,364)	($3,979)
Pct Scenarios	-	10%	5%	21%	57%

Table 2

	Variable Annuity (125 bps)	100% Stock Fund	90% Stock Fund, 10% Risk Free Asset	84% Stock Fund, 16% Risk Free Asset	65% Stock Fund, 35% Risk Free Asset
Average NPV Profits	$2,774	$4,237	$3,795	$3,543	$2,774
Std Dev	$3,613	$4,322	$3,870	$3,613	$2,830
CTE90	($2,800)	($3,127)	($2,800)	($2,614)	($2,048)
Pct Scenarios	-	10%	86%	84%	57%

Table 3

	Variable Annuity (132 bps)	83% Stock Fund, 17% Risk Free Asset
Average NPV Profits	$3,516	$3,516
Std Dev	$3,906	$3,586
CTE90	($2,436)	(2,595)
Pct Scenarios	-	53%

fund, which leads to a much riskier investment. Other blends in the mutual fund would match the standard deviation and CTE90, but would achieve lower profits than the variable annuity. If the market allows for gross margins of 150 bps and your company is comfortable with the greater standard deviation of profits, then the variable annuity seems to be the better investment (assuming pricing expense, lapse, and mortality assumptions are met).

Now assume the same variable annuity is priced assuming 125 bps of gross margin. These results are shown in Table 2.

If the market does not allow gross margins greater than 125 bps, then it would be wise not to invest in variable annuities. Investing in a weighted portfolio of stocks and risk free assets will result in the same return with the less risk under the CTE90 and standard deviation risk measures. Furthermore, weighted portfolios can be derived resulting in greater expected returns with the same amounts of risk.

Clearly, the variable annuity investment is sensitive to pricing assumptions. Now assume the same variable annuity is priced assuming 132 bps of gross margin. These results are shown in Table 3.

Table 4: Return of Premium GMDB

Quartile	Number of scenarios better to invest in the weighted portfolio	% of scenarios better to invest in the weighted portfolio
1	134	54%
2	154	62%
3	148	59%
4	93	37%
Total	529	53%

Table 5: 4% Rollup GMDB

Quartile	Number of scenarios better to invest in the weighted portfolio	% of scenarios better to invest in the weighted portfolio
1	249	100%
2	242	97%
3	192	77%
4	104	42%
Total	787	79%

Based on the risk measures listed above (CTE90, standard deviation, and count of scenarios), from a risk/reward perspective, a weighted portfolio of 83 percent stocks and 17 percent risk free assets would be similar to the variable annuity. In other words, assuming pricing expense, lapse, and mortality assumptions are achieved, the variable annuity investment would produce the same return as the weighted portfolio for roughly the same risk.

Let's look a little further into the number of scenarios that the variable annuity present value of profits is less than the present value of profits of the alternative investment. Quartile 1 as shown in Table 4 is comprised of the 250 scenarios with the lowest cumulative market returns over the surrender charge period. Similarly, quartile 4 is comprised of the 250 scenarios with the highest cumulative market returns over the surrender charge period.

The distribution of scenarios producing better results for the weighted portfolio relative to the variable annuity seems relatively stable across quartiles. If the GMDB were more generous this would not be the case. The results for a product with a 4 percent guaranteed return on the GMDB are shown in Table 5.

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Table 6: 4% Rollup GMDB – Price for CTE90

	Variable Annuity (139 bps) 4% Roll-up	Variable Annuity (132 bps) ROP	83% Stock Fund, 17% Risk Free Asset
Average NPV Profits	$3,516	$3,516	$3,516
Std Dev	$4,992	$3,586	$3,586
CTE90	($4,262)	($2,595)	($2,595)

Table 7: 4% Rollup GMDB – Price for CTE90

	Variable Annuity (139 bps) 4% Roll-up	114% Stock Fund, -14% Risk Free Asset	146% Stock Fund, -46% Risk Free Asset
Average NPV Profits	$3,516	$4,826	$6,200
Std Dev	$4,992	$4,922	$6,323
CTE90	($4,575)	($3,562)	($4,575)

Relative to alternate investments, the variable annuity with a 4 percent rollup would be considered incorrectly priced with gross margins of 132 bps. It would be wiser to invest the surplus in the alternate investments.

If the additional GMDB expense of a 4 percent rollup benefit was offset by the breakeven price of an additional 7 bps (i.e., 139 bps of gross margins), then the risk profile on Table 6 above shows how the risk increased substantially and that the breakeven pricing is, of course, inadequate to provide for the risk.

While the new 4 percent rollup variable annuity, the ROP annuity and the weighted portfolio investment produce the same expected return, the CTE90 and standard deviation show us the variable annuity with a 4 percent roll up GMDB is more risky. The company writing the variable annuity with a 4 percent roll up should be compensated for that additional risk.

The logical follow up question should be how much should the company be compensated for the additional risk? The company should price for an additional risk charge to equate the appropriate risk measures.

In Table 7, we have bracketed the risk of the VA with two different alternate investments. Neither fund comes very close on both measures of risk. The annuity with the 4 percent roll-up benefit has moderate volatility as measured by the standard deviation but has higher tail risk because of the structure of the death benefit. When management looks at Table 7, another discussion of risk tolerance can be held. The risk level shown in Table 7, which shows that a 4 percent roll-up benefit is equivalent to a leveraged stock fund, may be a higher level of risk than many companies will want to retain. This analysis can be repeated after the impact of a hedging or reinsurance program to view the residual risk and the risk reward

Table 8

	Variable Annuity – Age 45	Variable Annuity – Age 55	Variable Annuity – Age 65	83% Stock Fund, 17% Risk Free Asset
Average NPV Profits	$3,784	$3,516	$2,850	$3,516
Std Dev	$3,714	$3,906	$4,532	$3,586
CTE90	($1,276)	($2,436)	($5,436)	($2,595)

trade-off. This technique provides a potential basis for evaluating partial reinsurance or hedging programs.

To match the return of the 114%/-14% fund, the variable annuity would need 152 bps of revenue. In other words, the risk charge to match the expected return of a market priced investment alternative would be 13 bps above the 7 bps expected cost. To match the expected revenue of the 146%/-46% alternative, an additional 27 bps would be needed above the 7 bps expected cost.

Another assumption the above analysis does not account for is the variability of the age of the variable annuity contract holders. The above analysis assumes the age of the contract holders is 55. As you can imagine, if the GMDB mortality charge does not vary by age, the average age of the variable annuity block has a large impact on the risk/reward perspective. Table 8 assumes 132 bps of gross margin and the GMDB is return of premium.

With a flat charge for GMDB costs across all ages, the risk reward comparison is highly dependent on the assumed distribution of ages. The risk that the ages of the future buyers will not match the pricing model may be substantial. Higher ages show slightly lower profits and much higher risk. If pricing assumptions do not distinctly account for age, the variable annuity block is susceptible to anti-selection.

This article presents a simple test to verify that the expected level of return from a variable annuity is adequate for the risk level. This type of test does not need to be limited to variable annuities. All variable insurance products are tied to market returns. Furthermore, modifications to the test should allow comparisons between general account products and investments in the bond markets. In the end, this approach works because many insurance contracts are essentially complex financial instruments.

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Asset-Backed Securities as a Low Volatility Alternative to Intermediate Government Bonds

by Paul J. Donahue, Rick N. Wilson and Lisa Reed[1]

Asset-Backed Securities

Every "security," even as expansively as that term is defined in Section 2.a.1 of Securities Act of 1933[2], is of course "asset-backed" in a non-technical interpretation of that term. Whole life policies backed by an insurance company general account are in this general sense "asset-backed securities," as are bank savings accounts.

"Securitization" in its broadest sense is nothing new, and is the core mission of all financial intermediaries. Increased specialization, and the development of trust structures that have as their one purpose to "repackage" liabilities in a form that has more predictable returns and greater liquidity, has contributed importantly to the ever-growing efficiency of capital markets in the United States.

The collateral that backs "asset-backed securities" is balances owed by individual debtors to a single firm. Home equity loans, auto loans and credit-card balances made up over 60 percent of ABS collateral for 2002 structures.[3] With the collateral as its assets, a trust issues debt instruments, payments on which are supported solely by the collateral, and by any credit enhancement the trust may purchase from a monoline insurer. Imagination, capital market demand, and the rating agencies impose the only limits on the form the obligations of the trust may have.

Market Environment

Although the long period of decline in interest rates appears finally to have come to an end, the still low level of available yields suggests that investors would be prudent to investigate alternatives to traditional investment strategies. Intermediate government bonds have long had a place in the asset allocation strategies of many fixed-income investors. Government securities eliminate credit risk and minimize the liquidity risk. Thus, they are well suited to adjusting portfolio duration according to the manager's views on the duration of interest rates.

This article compares the risk/return characteristics of the Lehman 1-5 Year Government Index to that of the Lehman ABS Index. The rules for construction of the indices make them reasonable proxies for the investment universes open to managers for these two asset classes.[4] For ABS in particular, the index is very stable.[5]

ABS is a very high quality asset class. Of the ABS included in the Lehman Index, 91.5 percent have a credit rating of AAA.[6] Of the investment grade ABS

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2) The term "security" means any note, stock, treasury stock, security future, bond, debenture, evidence of indebtedness, certificate of interest or participation in any profit-sharing agreement, collateral-trust certificate, preorganization certificate or subscription, transferable share, investment contract, voting-trust certificate, certificate of deposit for a security, fractional undivided interest in oil, gas, or other mineral rights, any put, call, straddle, option, or privilege on any security, certificate of deposit, or group or index of securities (including any interest therein or based on the value thereof), or any put, call, straddle, option, or privilege entered into on a national securities exchange relating to foreign currency, or, in general, any interest or instrument commonly known as a "security," or any certificate of interest or participation in, temporary or interim certificate for, receipt for, guarantee of, or warrant or right to subscribe to or purchase, any of the foregoing.

3) MARK HEBERLE, *2002 Global ABS Issuance Review,* WACHOVIA SECURITIES STRUCTURED PRODUCTS RESEARCH, January 28, 2003.

4) See, e.g., *Index Turnover: A Guide to Global Index Dynamics and Compositional Drift during the First Six Months of 2003,* BRIAN UPBIN AND DAVE LAVELLE, in LEHMAN BROTHERS FIXED INCOME RESEARCH, July 31, 2003, pp. 38-43.

5) Ibid., p. 41.

6) Ibid, p. 30.

rated by Standard & Poors on January 1, 2003, none had defaulted by June 30, 2003.[7] Based on multi-year rating transition data by rating category and the rating composition of the Lehman ABS Index, we calculate that the three-year default rate for the index is less than 1/10th of 1 percent.[8]

The table below analyzes 10 years of data for the period ending June 30, 2003. The rapid, and quite recent, growth in ABS means little is to be gained from including any earlier period. From 1988 to 2002, United States ABS issuance increased from $14.3 billion to $297.0 billion.[9] From 1996 through 2002, worldwide ABS issuance increased from $242 billion to $606 billion.[10] Total outstanding ABS is now $1.33 trillion.[11]

The duration of the ABS Index is 2.98, compared to 2.17 for the Government 1-5 Index. Investing in the ABS Index therefore involves more exposure to changes in the term structure of interest rates than does investment in the Government Index. The table below will include data that adjusts for the differences in duration.

It should also be noted that cash flow differences between the two indices could result in subtle return differences. The rules that govern inclusion in the Government 1-5 Index limit eligibility to U.S. Treasury and agency securities with average lives of greater than one year but less than five years. The ABS Index includes securities with average lives in excess of 10 years. Therefore the shape, and change in shape, of the term structure of interest rates will affect the ABS Index differently from how they affect the Government 1-5 Index.

Risk/Return Characteristics

The table below sets out average returns, standard deviation of returns and Sharpe ratios for the Lehman ABS Index and for the Lehman Government 1-5 Index.[12]

The columns "Excess Return" shows the return difference between the ABS Index and Government 1-5 Indices and Treasury securities of like duration.[13] For the comparison we are making between asset classes, the difference in excess returns is the most significant result, because it shows the return advantage of the difference in asset class. This difference is 0.035 percent for average monthly return, and 0.37 percent for an average rolling 12-month return. The rest of the difference in returns between the two indices (0.57 percent -0.51 percent -0.035 percent= 0.025 percent monthly and 7.23 percent – 6.50 percent

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	Lehman ABS Index data 7/93 to 6/03	Excess Return	Government 1-5 data 7/93 to 6/03	Excess Return
Average Monthly Return	0.57%	0.042%	0.51%	0.0073%
Standard Deviation	0.73%	0.24%	0.64%	-
Sharpe Ratio	0.28	-	0.22	-
Rolling 12 Month Average Return	7.23%	0.45%	6.50%	0.079%
Standard Deviation	3.39%	0.69%	2.99%	-
Sharpe Ratio	0.75	-	0.61	-

8) See ERKAN ERTURK, PATRICK COYNE, AND JAY ELENGICAL, Ratings Transitions 2002: U.S. ABS Weather a Turbulent Year, in STANDARD & POOR'S RATINGS DIRECT, January 31, 2003, pp. 7-8. The three year default rate for AAA was .02%, for AA, .31%, for A, 1.51% and for BBB, .97%.

9) Ibid., p. 10.

10) MARK HEBERLE, op. cit., p. 3.

11) Bloomberg CMO/ABS Market Profile, July 31, 2003.

12) Data is from the Lehman Live Web site, Lehman Brothers Global Family of Fixed Income Indices analytics section, July 23, 2003.

13) The Government 1-5 Index has a very small excess return because the index includes agency securities.

-0.37 percent = 0.36 percent rolling 12 month) is due to the difference in duration.

In recent years, the return advantage for ABS has been much greater than the 10-year averages shown above. For the 12-month periods ending in June 2003, June 2002 and June 2001, the return advantage for a twelve month average for ABS was .91 percent, 2.05 percent and 2.13 percent respectively. For those same periods, the excess return was -0.11 percent, 1.63 percent and 1.53 percent. Again, recent ABS excess return has been significantly greater than the 10-year average.

These differences are very significant at the low-risk end of the risk/return spectrum. Investment managers might well consider allocating some part of their exposure to intermediate government obligations to ABS.

Diversification and Transactions Costs

The rapid, massive growth in ABS issuance and in ABS outstanding has greatly increased the economic efficiency of the ABS market. However, transaction costs vary significantly by position size. For a $5 million position in the credit card or automobile sectors, the bid/offer spread is typically about 0.03 percent. The bid/offer spread for a $0.5 million position will typically be from 0.25 percent to 0.45 percent more than for a $5 million position, and the bid/offer spread for a $0.1 million position will typically be from 0.50 percent to 1.0 percent more than for a $5 million position. For home equity loan ABS, the typical bid/offer spread for a $5 million position is 0.09 percent, and the increase in bid/offer spread for a $0.1 million position is typically at least 1.0 percent.

Managers of large ABS funds would have at least 100 and up to 300 or more positions in their ABS portfolios.

To realize the full value offered by the comparisons to the Index set out above, with the degree of diversification considered prudent by experienced ABS managers, an ABS portfolio must be at least $500 million. Investors with a smaller allocation to ABS should seek out a low-expense commingled fund for their exposure to this asset class.

Conclusion

ABS is an asset class that offers a very high degree of safety, returns highly correlated with 1-5 year government bonds, with returns superior to those of government bonds on a risk-adjusted basis. Investors should consider replacing some or all of their allocation to intermediate government bonds with allocations to ABS. All but the largest investors should access this asset class using low-cost commingled funds.

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Plan To Attend the Investment Section Sessions and Events at the SOA Annual Meeting in Orlando!

Monday, October 27

10:30 AM–12:00 PM • SESSION 6 PD

EQUITY ANALYSTS LOOK AT INSURERS (STILL)

Monday, October 27

12:15 PM–1:45 PM • SESSION 21 SM

INVESTMENT SECTION LUNCHEON: THE FINANCIAL MARKETS, DIVERSIFICATION AND THE CYCLICAL NATURE OF INVESTMENTS

Special guest speaker Peter Ricchiuti is a finance professor and dean at Tulane University's A. B. Freeman School of Business. He is founder of the Burkenroad Reports research program which has been featured on CNBC, CNN-fn and in the *Wall Street Journal* and New York Times. His unique style and humorous delivery have twice made him Tulane's top professor.

This luncheon is open to all meeting attendees. There is a nonrefundable charge of $10 for section members and $30 per person for all others. Please include the additional fee with your registration.

Monday, October 27

2:00 PM–3:30 PM

SESSION 26 BG

RISK MANAGEMENT TASK FORCE BUZZ GROUPS

Tuesday, October 28

8:30 AM–10:00 AM • SESSION 64 TS

NEW AND EXCITING INSTRUMENTS FOR THE BULLS AND BEARS

Tuesday, October 28

2:30 PM–4:00 PM • SESSION 92 TS

INTRODUCTION TO CREDIT DERIVATIVES

Tuesday, October 28

5:30 PM–7:00 PM • SESSION 97 SM

FINANCIAL REPORTING AND INVESTMENT SECTION JOINT RECEPTION

Join your fellow section members on the terrace at the Walt Disney World Swan Hotel for hors d'oeuvres, drinks, music and the opportunity to network with your friends and colleagues while enjoying the Florida sunset! **This reception is open to members of the Financial Reporting and Investment Sections only and their registered guests. There is a nonrefundable fee of $10 per person. Please include the additional fee with your registration.**

Wednesday, October 29

10:30 AM–12:00 PM • SESSION 113 PD

INVESTMENT-RELATED ASSUMPTIONS

Wednesday, October 29

2:00 PM–3:30 PM • SESSION 126 PD

Specialty Track: General/Financial Reporting/Investment

GLOBAL DEVELOPMENTS IN INSURER SOLVENCY ASSESSMENT

Wednesday, October 29

2:00 PM–3:30 PM • SESSION 129 PD

INVESTMENT PERFORMANCE ATTRIBUTION

Wednesday, October 29

2:00 PM–3:30 PM SESSION 131 I

Specialty Track: Retirement Systems Practice Area/Investment

THE FUNDING METHODS ARE FALLING! THE FUNDING METHODS ARE FALLING!

Pension Accounting & Personal Saving

by Annamaria Lusardi, Jonathan Skinner and Steven Venti [1]

Editor's Note: This article is reprinted with permission. It last ran in the April 2003, Number 8 issue of Just the Facts On Retirement Issues *from the Center for Retirement Research at Boston College.*

Introduction

In the past two decades, the personal saving rate in the United States has declined dramatically, from 10.6 percent of disposable personal income in 1984 to a low of 2.3 percent in 2001, before bouncing back to 3.9 percent in 2002 (U.S. Department of Commerce, 2003). There is considerable debate over the reasons for this decline in the personal saving rate, as calculated by the National Income and Product Accounts (NIPA), as well as its usefulness as an indicator of saving. Many observers have questioned the influence of stock market wealth on conventionally measured personal saving rates and have noted three major ways in which the stock market and saving may be linked.

First, NIPA saving measures fail to account for capital gains. So, when households spend newly gained housing or stock market wealth, their NIPA consumption increases but their income does not. Since saving is the difference between income and consumption, saving automatically declines as consumption rises. Recent studies have attempted to quantify the behavioral link between household consumption changes and stock market gains, with estimates ranging from two cents per dollar of wealth to ten cents or more.

The second linkage between the stock market and saving involves taxation of capital gains. When individuals sell appreciated stock, they must pay capital gains taxes. The realized gains do not affect NIPA income, but the taxes paid reduce disposable income. Even under the extreme assumption that individuals do not increase their consumption when they realize capital gains, NIPA saving would still decline because the increased taxes reduce disposable income. Capital gains taxes as a fraction of disposable income are estimated to have doubled between 1988 and 2000, rising from 0.8 percent to 1.7 percent in 2000 (Perozek and Reinsdorf, 2002).

The final way in which the stock market can affect personal saving, which is the focus of this brief, has to do with the treatment of pension plans in the NIPA. We show that dramatic swings in asset markets have perverse effects on the personal saving rate. Indeed, according to the official NIPA accounting rules, the entire retirement saving sector contributed nothing to measured personal saving between 1996 and 2000.

The analysis discussed in this piece covers the years 1988-2000, a time when the stock market was booming and personal saving rates were dropping. While these conditions have reversed with the onset of the bear market in 2000, understanding the experience of the 1990s offers key insights into what is happening today.

Trends in Pension Contributions

The principal sources of private retirement saving in the United States are defined contribution and defined benefit pension plans sponsored by employers—both private and public—and personal saving arrangements such as Individual Retirement Accounts (IRAs). Assets in pension plans and IRAs have grown considerably over the past two decades. Between 1975 and 2000, the ratio of retirement assets to disposable income increased over four-fold. Although assets in both defined contribution and defined benefit plans have grown enormously, annual contributions to each plan type have taken different paths.

Over the past two decades, contributions to defined contribution plans have risen dramatically. Most of this growth has been in 401(k) plans, which expanded rapidly after 1982. These plans have grown for a number of reasons. Employees appreciate their greater flexibility and portability. Employers usually find 401(k)s less costly to administer than defined benefit plans, and they can shift the investment risk to the employee (Munnell, Sundén and Lidstone, 2002). Similar to defined contribution plans, IRAs also grew quickly following a legislative change in 1981, but were curtailed significantly by the Tax Reform Act of 1986.

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1) Annamaria Lusardi is associate professor of economics at Dartmouth College. Jonathan Skinner and Steven Venti are professors of economics at Dartmouth College and research associates at the National Bureau of Economic Research. The original research on which this brief is based was supported by the National Institute on Aging.

In contrast to the trend in defined contribution plans, contributions to defined benefit plans have leveled off since the mid-1980s. Contributions have been flat not only because the share of workers covered by these plans has dropped but also because federal policies have effectively linked defined benefit contributions to asset market performance. In 1974, the Employee Retirement Income Security Act (ERISA) set minimum and maximum funding requirements for defined benefit pensions. When stock and bond prices increase, many firms respond by cutting back on pension contributions. In 1987, the Omnibus Budget Reconciliation Act redefined "full funding" and limited pension assets to no more than 150 percent of the legal liability (the balance firms must hold to pay future benefits). Funds up against this ceiling could no longer make tax-deductible contributions to their pension plans. In addition, increases in "reversion taxes"—i.e., taxes on any assets that remain after a plan is terminated—further discouraged contributions (Bernheim and Shoven, 1988 and Ippolito, 2001).

Overall, the size of the retirement saving sector doubled between 1994 and 2000, to a large extent because of massive increases in stock prices inside these accounts. By 2000, private and public pension plans held $9.1 trillion of assets, while IRAs held another $2.6 trillion

The Pension Sector and NIPA Saving

A booming asset market means that, by NIPA conventions, resources flowing into the retirement sector will lag resources flowing out of the sector. To see this, it is important to understand exactly how pension funding and distributions are treated in the NIPA personal saving measure.

First, employer-sponsored pension funds are classified as the property of the individual employees. Therefore, both employee and employer contributions to defined contribution and defined benefit plans are counted as personal income during the employees' worklives when the contributions are made. Interest and dividend earnings on these contributions are also included in employees' NIPA income in the year in which they occur. As noted above, capital gains on the investments are not included in NIPA income.

Second, when employees retire and begin receiving distributions from a defined benefit or defined contribution plan or an IRA, the distributions do not show up as personal income because they were already counted as income during the employees' worklives (again, with the notable exception of capital gains, which are never counted as NIPA income). Of course, the consumption that the pension-related distributions allow does show up as NIPA consumption. This treatment makes sense from the perspective of an individual: over the first part of the life-cycle a worker diverts some income to saving and, in later years, a worker receives and consumes retiree benefits.[2]

However, funny things happen when this NIPA convention is applied to the group of post-war workers who were most likely to hold defined benefit pension plans. In a fully funded system, the rate of growth of contributions will be less than the rate of growth of benefits because a large share of benefits will be paid out of the fund's capital gains. This fact alone will drag down the NIPA saving rate. If asset prices are booming, pension plans can, in principle, pay benefits entirely from sales of appreciated assets and remain fully funded. This situation is exacerbated by the host of legal and regulatory restrictions (discussed above) that further depress contributions.

Moreover, not only do the benefits paid by the pension sector raise consumption without increasing income, they also trigger a tax liability that lowers NIPA income.[3] This liability occurs because at least a portion of pension benefits are included in an individual's taxable income. Note that the tax liability and the associated income are separated in time as the original pension contribution counted as NIPA income but was not subject to tax at the time it was made.[4]

How Large Is the Impact?

How serious of a drag on NIPA saving might the treatment of pension plans be? Assume for the

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2) The NIPA accounting for defined contribution plans and IRAs seems to be an appropriate fit for this life-cycle perspective, but, according to Perozek and Reinsdorf (2002), it is less clear that defined benefit plans should be treated the same way. For example, individual employees do not "own" or exercise control over contributions to defined benefit plans the way they do with defined contribution plans. For this reason, Perozek and Reinsdorf suggest an alternative under which defined benefit plan funding would be treated as part of business saving rather than personal saving with distributions from defined benefit plans counted as income for individual retirees.

3) Note that this effect tends to drag down personal saving, but at the same time boost business saving as corporations need no longer contribute to their defined benefit plans.

4) The tax treatment of traditional IRAs is consistent with this statement. However, Roth IRAs differ—they are taxed when the contributions are made, not when distributions occur.

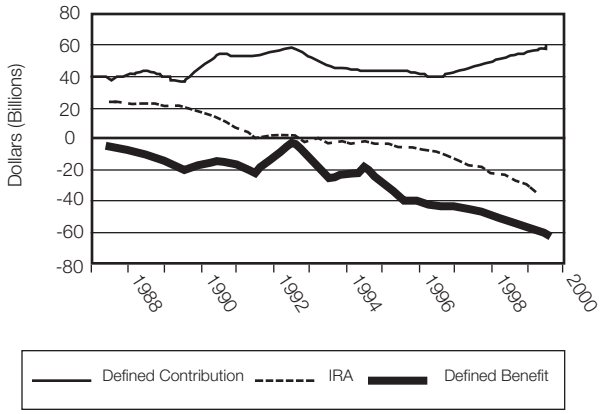
moment that all benefits paid are consumed. Then in each year the contribution of the pension sector to NIPA saving is:

{Saving} = {Contributions} + {Interest and dividend earnings} - {Benefits paid}

Since the mid-1980s, benefit payments from defined benefit plans have exceeded contributions. In 1998, the most recent year for which data are available, employers contributed about $35 billion to defined benefit plans, but disbursed about $111 billion of benefits. Moreover, interest and dividend earnings in this year amounted to only $26 billion. More generally, defined benefit plans (and, to a lesser extent, IRAs) have had distributions well in excess of income components throughout the 1990s.[4] Despite this outflow, the value of defined benefit plan assets rose rapidly during this period due to the booming stock market. Among defined contribution plans, many of which are recently established 401(k) programs, contributions have always outpaced distributions. Thus, unlike defined benefit plans, defined contribution plans have contributed positively to NIPA saving.

To see how these trends affect the measured saving rate, Figure 1 shows the net contribution to NIPA saving for defined benefit plans, defined contribution plans and IRAs during the years 1988-2000.[3] This net contribution is simply the difference between NIPA income components (contributions plus investment earnings) and NIPA consumption (equal to benefits assuming they are fully consumed). Defined benefit plans reduce NIPA saving in all years since 1988, and the amounts are increasingly large through 2000. Thus, for example, NIPA saving was lower by $60.7 billion in 2000 due to defined benefit plans. In contrast, the impact of defined contribution plans on NIPA saving is large and positive in all years. In 2000, they generated positive savings of $58.4 billion. The net contribution of IRAs has been negative since 1994. By 2000, outflows from IRAs exceeded inflows by $35.7 billion.

FIGURE 1: NET CONTRIBUTION TO NIPA SAVINGS



Source: U.S. Department of Labor (2002), U.S. Department of Treasury (2002), and authors' projections.

5) IRA contributions in this analysis include only tax-deductible contributions and ignore contributions from rollovers. Rollovers are not counted as new saving in the NIPA framework because they reflect previous saving through employer sponsored pension plans.

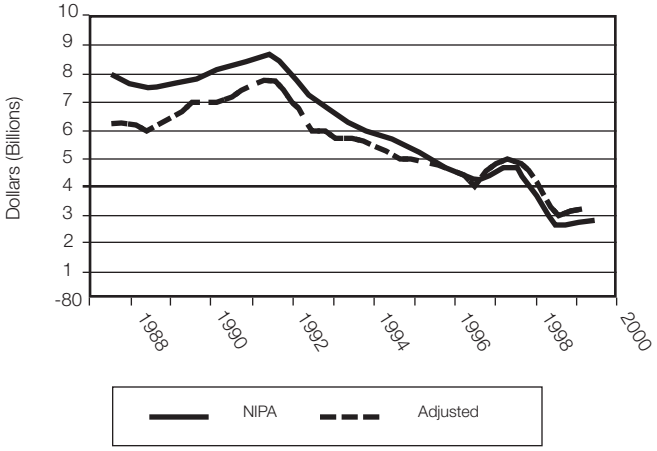
6) Data for 1999 and 2000 are projections. See Lusardi, Skinner, and Venti (2001) for additional details on how each series in the figure was derived.

Figure 2 shows what the NIPA saving rate would have been without transactions involving defined benefit plans, defined contribution plans and IRAs. Of the 5-percentage-point drop in the NIPA saving rate between 1988 and 2000 (from 7.8 percent to 2.8 percent), fully 2.1 percentage points, or 42 percent, is explained by the accounting of pension plan inflows and outflows. Put another way, between about 1996, when the two lines in Figure 2 cross, and 2000, retirement saving accounts contributed nothing to NIPA saving.

Conclusion

Stock market wealth has had a direct effect on consumption. However, it is not just stock market wealth that has dragged saving rates down to low levels. The treatment of pension plan contributions and benefits has also played a large role, accounting for over 40 percent of the total decline in the personal saving rate from 1988 through the turn of the century. But the recent economic downturn and stock market implosion suggest a reversal of the pattern of the 1990s may now occur, meaning that personal saving will begin rising. While it's too early to tell for sure, the recent evidence is certainly consistent: personal saving has rebounded somewhat in the past year to 3.9 percent of disposable income (up from 2.8 percent in 2000). In short, secular changes in personal saving rates may tell us less about the thriftiness of American families and more about the rules of national income accounts.

FIGURE 2: NIPA SAVING RATE WITH AND WITHOUT DEFINED BENEFIT, DEFINED CONTRIBUTION AND IRA PLANS



Source: U.S. Department of Labor (2002), U.S. Department of Treasury (2002), and authors' projections.

References

Bernheim, B., and J. Shoven. 1988. "Pension Funding and Saving," in *Pensions in the U.S. Economy*, edited by Z. Bodie, J. Shoven, and D. Wise. University of Chicago Press: 85-111.

Ippolito, R. 2001. "Reversion Taxes, Contingent Benefits, and the Decline in Pension Funding," *Journal of Law and Economics* 44 (April): 199-232.

Lusardi, A., J. Skinner, and S. Venti. 2001. "Saving Puzzles and Saving Policies in the United States," *Oxford Review of Economic Policy* 17: 95-115.

Munnell, Alicia H., Annika Sundén, and Elizabeth Lidstone. 2002. "How Important Are Private Pensions?" *Issue in Brief* 8 (February). Chestnut Hill, MA: Center for Retirement Research at Boston College.

Perozek, M., and M. Reinsdorf. 2002. "Alternative Measures of Personal Saving." *Survey of Current Business* (April): 13-24.

U.S. Department of Commerce. 2003. National Income and Product Account Tables, Table 2.1. Washington, DC: Bureau of Economic Analysis.

U.S. Department of Labor. 2002 and earlier years. *Private Pension Plan Bulletin, Abstracts of Form 5500 Annual Reports.* Washington, DC: Employee Benefits Security Administration.

U.S. Department of the Treasury. 2002 and earlier years. *Statistics of Income Bulletin.* Washington, DC: Internal Revenue Service.

What Makes the Yield Curve Move?

by Tao Wu

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One common misperception about monetary policy is that the Federal Reserve controls *all* interest rates. In fact, the Fed controls only a very short-term rate, the federal funds rate; this is the rate banks charge each other for overnight loans of reserves. Yet Fed policymakers—and central bankers generally—are vitally concerned with the behavior of interest rates of all maturities. In particular, policymakers would like to understand how a change in short-term rates will affect medium-term and long-term rates, because these latter rates determine the borrowing costs people and firms face, which, in turn, determine aggregate demand in the economy.

The yield curve, which plots a set of interest rates of bonds of different maturities, describes the relationship among short-term, medium-term and long-term rates at a given point in time. It has been the subject of much research in the finance literature, because it is the natural starting point for pricing fixed-income securities and other financial assets. While this research has provided useful statistical explanations of movements in the yield curve, it has not focused on what causes the yield curve to move. This *Economic Letter* reviews some of the latest studies in both finance and macroeconomics that have explored the macroeconomic determinants of the yield curve.

Finding the common factors

Typically, the yield curve depicts a line that rises from lower interest rates on shorter-term bonds to higher interest rates on longer-term bonds. Researchers in finance have studied the yield curve statistically and have found that shifts or changes in the shape of the yield curve are attributable to a few unobservable factors (Dai and Singleton 2000). Specifically, empirical studies reveal that more than 99 percent of the movements of various Treasury bond yields are captured by three factors, which are often called "level," "slope" and "curvature" (Litterman and Scheinkman 1991).The names describe how the yield curve shifts or changes shape in response to a shock, as shown in Figure 1. Panel A of Figure 1 illustrates the influence of a shock to the "level" factor on the yield curve. The solid line is the original yield curve, and the dashed line is the yield curve after the shock. A "level" shock changes the interest rates of all maturities by almost identical amounts, inducing a parallel shift that changes the *level* of the whole yield curve. Panel B shows the influence of the "slope" factor on yield curve. The shock to the "slope" factor increases short-term interest rates by much larger amounts than the long-term interest rates, so that the yield curve becomes less steep and its *slope* decreases. Panel C shows the response of the yield curve to a shock to the "curvature" factor. The main effects of the shock focus on medium-term interest rates, and consequently the yield curve becomes more "hump-shaped" than before.

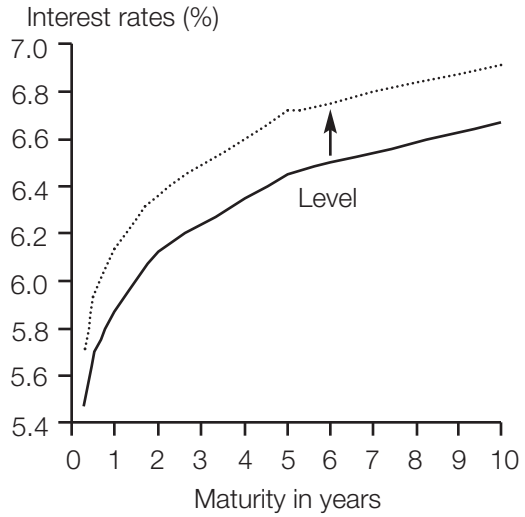
Various models have been developed and estimated to characterize the movement of these unobservable factors and thereby that of the yield curve by financial economists and bond traders in asset-pricing exercises. Few of these models, however, provide any insight about what these factors are, about the identification of the underlying forces that drive their movements or about their responses to macroeconomic variables. Yet these issues are of most interest to central bankers and macroeconomists.

Macroeconomic interpretations of why the yield curve moves

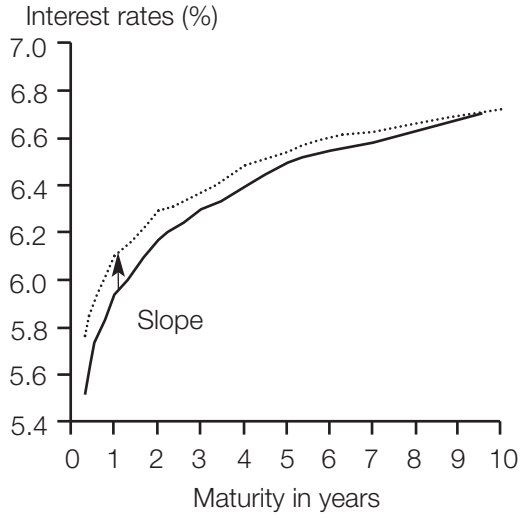
Macroeconomists view the Federal Reserve as controlling the short end of the yield curve, that is, the federal funds rate, in response to fundamental macroeconomic shocks in order to achieve its policy goal of a low and stable inflation and maximum sustainable output. Therefore, macroeconomic variables, through defining the state of the economy and the Federal Reserve's policy stance, will be useful in explaining movements in the short end of the yield curve. Furthermore, expectations about future short-term interest rates, which determine a substantial part of the movement of long-term interest rates, also depend upon macroeconomic variables. For instance, when the Federal Reserve raises the federal funds rate in response to high inflation, expectations of future inflation, economic activity and the path of the federal funds rate all contribute to the determination of the long-term interest rates. Therefore, one would expect macroeconomic variables and modeling exercises to be quite informative in explaining and forecasting the yield-curve movements. However, until very recently, standard macroeconomic models have not incorporated long-term interest rates or the yield curve. And even when they have, as in Fuhrer and Moore (1995),

Figure 1: Effects of level, slope and curvature on yield curve

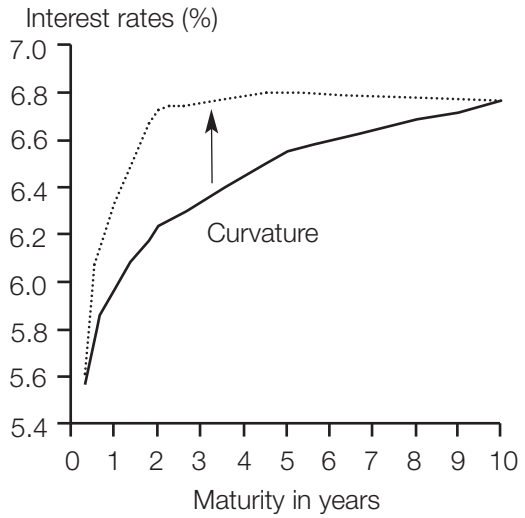
A. Level



B. Slope



C. Curvature



most of the attention is still on the correlation between the real economy and the shortest-term interest rate in the model rather than on the whole yield curve.

Several recent economics and finance papers have explored the macroeconomic determinants of the unobservable factors of the yield curve identified by empirical finance studies. Wu (2001) examines the relationship between the Federal Reserve's monetary policy "surprises" and the movement of the "slope" factor of the yield curve in the U.S. after 1982. His study identifies monetary policy "surprises" in several ways to make the analysis more robust; the results indicate a strong correlation between such monetary policy "surprises" and the movement of the "slope" factor over time. In particular, he finds that the Federal Reserve's monetary policy actions exert a strong but short-lived influence on the "slope" factor: they explain 80-90 percent of the movement of "slope" factor, but such influences usually dissipate in one to two months. At the same time, monetary policy "surprises" do not induce significant changes in the "level" factor, implying that during this period the Federal Reserve affects the yield curve primarily through changing its slope.

Ang and Piazzesi (2001) examine the influences of inflation and real economic activity on the yield curve in an asset-pricing framework. In their model, bond yields are determined not only by the three unobservable factors—level, slope and curvature—but also by an inflation measure and a real activity measure. They find that incorporating inflation and real activity into the model is useful in forecasting the yield curve's movement. However, such effects are quite limited. Inflation and real activity and medium-term bond yields (up to a maturity of one year), but most movements of long-term bond yields are still accounted for by the unobservable factors. Therefore, they conclude that macroeconomic variables cannot substantially shift the level of the yield curve.

Evans and Marshall (2001) analyze the same problem using a different approach. They formulate several models with rich macroeconomic dynamics and look at how the "level," "slope" and "curvature" factors are affected by the structural shocks identified in those models. Their conclusion confirms Ang and Piazzesi's (2001) result that a substantial portion of short- and medium-term bond yields is driven by macroeconomic variables. However, they also find that in the long run macroeconomic variables do indeed explain much of the movement of the long-term bond yields, and the "level" factor responds strongly to macroeconomic variables. For instance, their identification results indicate that the changes in households' consumption preferences induce large, persistent, and significant shifts in the level of the yield curve.

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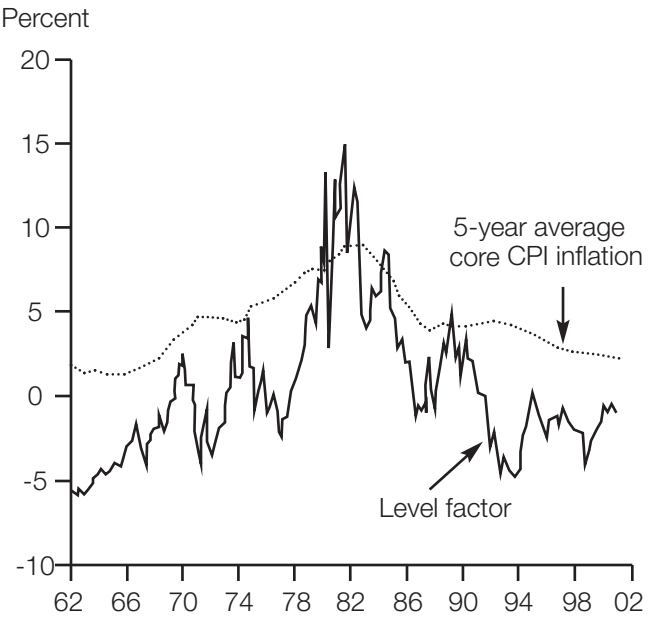
Figure 2
Level Factor and 5-year average core CPI inflation in the US: 1962 to 2000



Tentative conclusions

Recent literature generally agrees on the effects of macroeconomic variables, especially those of monetary policy, on the slope of the yield curve. A monetary policy tightening generates high nominal short-term interest rates initially, but, because of its anti-inflationary effects, these rates quickly fall back; since long-term rates embed expectations of this behavior of short-term rates, they rise by only a small amount. As a result, the slope of the yield curve declines when contractionary monetary policy shocks occur.

The conflicting results on the macroeconomy's effects on the movement of the level of the yield curve (Ang and Piazzesi 2001 and Evans and Marshall 2001) suggest a rich field for future research. After all, it is difficult to believe that the structure of the macroeconomy has little effect on long-term interest rates or on the level of the yield curve, since long-term nominal interest rates are the sum of expected long-run inflation and long-term real interest rates. Therefore, any structural macroeconomic movement contributing to the determinations of long-run expected inflation or long-term real interest rates will have a substantial influence on the "level" factor. For instance, in an inflation-targeting monetary regime, the inflation target is a natural anchor of expected long-run inflation, and therefore any changes in the market's perceptions of the inflation target will directly shift the level of the yield curve. Figure 2 plots the "level" factor and the five-year moving average of core consumer price inflation in the U.S. from 1962 to 2002. Clearly, the two series are quite similar. A simple regression shows that the movement of this inflation measure alone can explain 66 percent of the variability of the "level" factor in this period. Likewise, long-term changes in the structural economy, for example the technology innovations, will also influence the long-term real interest rates and therefore the level of the yield curve.

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References

[URLs accessed May 2003.]

Ang, A., and M. Piazzesi. 2001."A No-Arbitrage Vector Autoregression of Term Structure Dynamics with macroeconomic and Latent Variables." Working Paper. Columbia University. Forthcoming, *Journal of Monetary Economics.* http://www-1.gsb.columbia.edu/faculty/aang/papers/bond.pdf

Dai, Q., and K. Singleton. 2000. "Specification Analysis of Affine Term Structure Models." *Journal of Finance* 55 (October): 1,943–1,978.

Evans, C., and D. Marshall. 2001. "Economic Determinants of the Nominal Treasury Yield Curve." FRB Chicago Working Paper 01-16. http://www.chicagofed.org/publications/workingpapers/papers/Wp2001-16.pdf

Fuhrer, J. C., and G. R. Moore. 1995."Monetary Policy Trade-offs and the Correlation between Nominal Interest Rates and Real Output." *American Economic Review* 85 (March): 219–239.

Litterman, R., and J. A. Scheinkman. 1991."Common Factors Affecting Bond Returns." *Journal of Fixed Income* 1.

Wu, T. 2001."Monetary Policy and the Slope Factor in Empirical Term Structure Estimations." FRB San Francisco Working Paper 2002-07. http://www.frbsf.org/publications/economics/papers/2002/wp02-07bk.pdf

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Active Management or the Equity Risk Premium: Place Your Bets

by The Investment Risk Working Party

Abstract

The investment risk taken by a pension fund comprises strategic risk (i.e. the risk of the strategic asset allocation relative to the liabilities) and active risk (i.e. the risk of the fund relative to the strategic benchmark). In this paper we discuss:

- The relative merits of these two types of risk to the pension fund
- Possible rationales for the levels of strategic and active risk typically adopted
- Mechanisms for capturing manager skill without taking on equity risk
- Issues in setting liability-based benchmarks for investment managers

Mike Brooks is head of investment risk at Baillie Gifford & Co.; Leon Beukes is associate, quantitative research at Hewitt Bacon & Woodrow Limited; David Bowie is a partner at Hymans Robertson Consultants and Actuaries; Hugh Cutler is director of European institutional business, Barclays Global Investors; Michael O'Brien is managing director of European institutional business, Barclays Global Investors.

Editor's Note: This article is reprinted with permission. It was a paper that was submitted at a previous conference held in June 22-24, 2003 for the Faculty and Institute of Actuaries Finance and Investment Conference. The Investment Working Party consisted of Mike Brooks (chairman), Leon Beukes, David Bowie, Hugh Cutler and Michael O'Brien.

This paper appears on the Web site for the UK actuarial profession, which can be found at www.actuaries.org.uk. The link to "Resource Centre/Conference Papers" points to the presentations for the last three Finance and Investment Conferences. Readers are encouraged to check out this treasure trove of information.

Executive Summary

- The minimum investment risk position for a pension fund can be represented by the "Liability Benchmark Portfolio," which typically comprises nominal and index-linked bonds.

- The pension fund may wish to move away from this minimum risk position with a view to enhancing returns and reducing the long-term contributions to the scheme for the sponsor (and/or enhance member benefits). There are two ways that this might be achieved:
  - Through an allocation to asset classes with the potential for higher returns (e.g. equities), taking on strategic risk.
  - Through employing active managers to add value relative to the market, taking on active risk.

- The relative merits of strategic risk and active risk are summarised in the table below.

Strategic Risk	Active Risk
• Positive equity risk premium implies risk likely to be rewarded over the long-term	• Zero-sum game, but…. • … pension funds may have advantage in accessing "alpha" • … risk return trade-off superior if skilful managers can be identified
• Costs of up to about 10 basis points (based on passive investing)	• Cost between 20 and 200 basis points depending on size and nature of fund (i.e. higher for long-short)

- Currently, pension funds typically have far higher levels of strategic risk than active risk. This may reflect:
  - o An aversion to active risk relative to strategic risk
  - o Lower return expectations from active management
  - o An inability to generate high levels of active risk, as it is diversified across managers
  - o An unintentionally high level of strategic risk due to lack of clarity in the definition of investment risk historically

- Given the ability to diversify active risk, even small levels of genuine long-term alpha (after fees) should be highly valued by pension funds.

- In reality, the decision on the split between strategic and active risk will be down to the subjective views of the trustees and their advisors. This will be influenced by their behavioural biases, level of investment expertise and the amount of time that they are able to devote to the investment policy.

- We expect to see a greater diversity of investment strategies being followed in the future. There are likely to be more long-term mandates being awarded although care needs to be taken on the clarity of risk and return objectives in order to avoid pitfalls from the past.

- Regardless of the investment approach adopted, one of the key messages from this paper is that pension funds should endeavour to ensure that the investment risk budget is clearly defined and that the risk return trade-offs of different investment decisions are understood. There is no one-size-fits-all solution to investment policy.

1. Background

"The focus of consulting actuaries used to be on how to maximise the long-run investment returns of pension funds and reduce costs to the sponsoring companies. Now the emphasis has shifted to the measurement and management of short-term solvency problems and the protection of beneficiaries."

This quote in a recent article written by Barry Riley in the *Financial News* highlights the increased focus on investment risk within UK pension funds. This is the result of an amalgam of factors creating the perfect storm currently buffeting the industry, including:

1. An increasing use of market-based valuation measures both within the actuarial profession and in company accounts (i.e. FRS17, IAS17, etc).
2. Weak equity markets, a questioning of the positive equity risk premium and an inability/unwillingness to sell out of equities at current (perceived) low levels.

3. Greater accountability/expertise expected from fiduciaries in terms of the management of pension plan financing and investment—primarily through the Myners recommendations

4. Higher profile of pensions risk management among the credit ratings agencies.

5. Increasing media coverage of pension scheme disasters, with some members close to retirement being left with nothing, having previously felt their pensions were assured.

These factors do not only call into question the level of investment risk being taken by pension funds, but also where it should be taken to most efficiently enhance returns. This working party's paper in 2001 demonstrated that for the majority of pension funds the investment risk coming from strategic asset allocation swamps the risk from active management. These findings supported two of the recommendations from the government-sponsored Myners report:

...funds should set both targets and risk controls which reflect this, allowing sufficient freedom for genuinely active management to occur.

- "The attention devoted to asset allocation decisions should fully reflect the contribution they can make to achieving the fund's investment objective."

- "Where they believe active management to have the potential to achieve higher returns, funds should set both targets and risk controls which reflect this, allowing sufficient freedom for genuinely active management to occur."

The latter recommendation is in tune with a general feeling that active managers should be given longer-term mandates that are less focused on tracking error and short-term performance relative to indices. In this paper we develop this debate:

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- Section 2 discusses the definition of investment risk and the minimum risk portfolio.
- Section 3 contrasts the relative merits of strategic and active risk to the pension fund.
- Section 4 analyses, and attempts to explain, the current typical split of investment risk.
- Section 5 provides an introduction to market-neutral investing.
- Section 6 highlights the importance of behavioural biases on the split of risk.
- Section 7 discusses future directions including the trend to longer-term mandates.

2. Defining the minimum risk strategy

Investment risk can be defined as the risk to scheme solvency resulting from the investment policy adopted. A theoretical zero-risk strategy is one in which the scheme will maintain the current solvency level regardless of the investment conditions that might prevail.

Whilst this definition sounds simple enough, it becomes fraught with confusion and controversy when one looks to define the basis for calculating the value of liabilities and assets. The industry has been in a state of flux in recent years with battles being fought between the traditionalists, favouring actuarially smoothed valuations, and the financial economists, favouring market-based approaches.

A more sophisticated approach might take explicit account of the incidence of likely cashflow.

Traditional actuarial approaches held sway until the ill-fated Minimum Fund Requirement (MFR) test was introduced in the late 1990s. While flawed in its design, it was the first acknowledgement that the markets dared to move away from actuarial theory and began the process whereby actuaries adopted more market related approach to valuations. More recently the new accounting standard, FRS 17, has provided yet another way of measuring liability value. The latest and, in our view most appropriate, candidate for the minimum risk position is the Liability Benchmark Portfolio.

The Liability Benchmark Portfolio

In their paper "A note on the relationship between pension assets and liabilities," Speed et al propose the concept of a liability benchmark portfolio (LBP). In essence, they define the LBP as the portfolio of assets that, in the absence of future contributions, benefit accrual or random fluctuations around the demographics and would maintain the current solvency level as economic conditions change.

Once the LBP has been identified it can be used as a (scaled) proxy for the liabilities. The relationship between the assets and liabilities will be demonstrated by how the LBP changes over time relative to the assets actually held (including the effect of any active portfolio management).

From the paper, the authors propose that the LBP should consist of fixed income and index-linked gilts that are chosen taking account of the liabilities':

- Duration;
- Sensitivity to inflation; and
- Incidence of cashflows.

What they do not propose is the use of corporate bonds as the constituents of the LBP (unlike FRS17). One other fundamental difference with FRS17 is that it is based on benefits due on discontinuance, whereas FRS17 treats the scheme as a going concern (and hence allows for future salary increases). In effect they propose that the liability measure should typically correspond to the liabilities on the defined accrued benefit method (DABM) as advocated by McLeish & Stewart (C M J.I.A. 114 338-424).

A more sophisticated approach might take explicit account of the incidence of likely cashflows. However, in most instances a portfolio identified entirely in terms of gilts with appropriate duration is likely to be adequate for practical applications.

Uses of the LBP

The LBP aims to meet a number of criteria, namely:

- Providing key decision makers with the expertise, education and information to carry out their responsibilities effectively.

- In particular, providing the key decision makers with a clear and measurable definition of the liabilities.

- Enabling the key decision makers to regularly monitor the effectiveness of their investment policy in the context of relative performance and risk.

- Making available the measurement of the liabilities on the same frequency as the assets.

It is important to note that use of the LBP does not advocate investing in bonds. It merely highlights to trustees, members and plan sponsors the risks to discontinuance solvency of the investment policy adopted. This then allows these stakeholders to make an informed decision on investment policy based on a clearer understanding of the risks to the security of members' benefits.

3. Establishing the Risk Budget

Having identified the minimum risk position we now need to consider the extent to which the pension fund may wish to move away from this position. The rationale for taking on investment risk is the belief that extra returns can be generated and this will reduce the long-term contributions to the scheme for the sponsor (and/or enhance member benefits)[1].

As Urwin et al (2001) discuss, the desire to take on investment risk will depend on a number of factors:

- The employer/sponsor **covenant** to meet future funding (and comfort with movements in FRS17 solvency levels). The stronger the covenant, the more risk can be taken.

- The **maturity** of the scheme. The longer the funding period, the more risk can be taken without compromising the security of final benefit payments.

- The current **funding position** (i.e. surplus/deficit). The larger the funding excess, the more risk can be taken.

- The **risk beliefs** of the trustees (i.e. their subjective views on risk and return).

We would add that the clarity of definition of investment risk is also key, given that the various liability valuation bases (e.g. MFR, FRS17, LBP) offer different views on the risk of an equity-based investment strategy.

Strategic or Active Risk

The two types of investment risk that a pension fund can take are strategic risk and active risk. Strategic risk arises from moving out of bonds and investing in asset classes with higher return potential such as equities[2]. Active risk refers to the risk that an active manager takes on relative to a benchmark in an attempt to produce outperformance.

There are fundamental reasons why we would expect equities to outperform bonds over the long-run (i.e. to compensate for higher economic risk and volatility of returns). A decision to invest in equities is therefore likely to be rewarded by higher long-term returns at the expense of greater uncertainty.

In contrast, active management is generally viewed as a "zero sum game," i.e. the average investor will perform in line with the market (and will underperform net of transaction costs and fees). Active risk will be rewarded over the long-term if, on average, the active managers selected by the pension fund genuinely possess investment skill (and this outweighs the costs associated with active management)[3].

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1) Financial economists would argue that there is no economic benefit to taking on investment risk within a defined benefit pension fund (see Exley et al). However, in practice most trustees take a "scheme-centric" view and do not explicitly consider the impact of pension fund investment decisions on the shareholders of the plan sponsor.

2) For simplicity, we equate strategic risk and equity risk in this discussion, although in practice the strategic asset allocation may include other asset classes such as property. There are a number of complications with the split between strategic and active risk that are discussed in more detail in the appendix.

3) Some investment markets may be particularly inefficient and offer more scope for outperformance. These include currency markets where central banks may be prepared to lose money for political reasons, and markets with major distortions in share ownership (e.g. the Japanese market in the 1990s).

Table 1: Typical Investment Strategies Based on Appetite for Strategic and Active Risk		Active Risk	
		No	Yes
Strategic Risk	No	Liability-matched bond strategy. No active management. (1 – 20 basis points)	Liability-matched bond strategy. Market-neutral active management overlay. (20 – 200 basis points)
	Yes	Allocation to equities, passively invested. (5 – 20 basis points)	Traditional balanced benchmark with long-only active management. (20 – 60 basis points)

Whilst the "zero sum game" principle applies across all investors, there are a number of reasons why pension funds may have the playing field tilted in their favour relative to individual investors. For example:

(a) Being able to negotiate lower fees

(b Because the assets—such as private equity opportunities—are effectively available only to large pools of money

(c) Because institutional investors can more cost-effectively lobby the investment managers to take an active role (or at least interest) in corporate governance

(d) Through greater access to manager research that enables them to identify the more skilful managers.

The implicit "ifs" above are probably quite significant. However, since active risks are typically non-systematic, shareholders can diversify them by using multiple active managers. Any 'alpha' being generated is then wealth that is added to their funds without taking on significant levels of risk.

The table above highlights some of the investment strategies that could be adopted based on different appetites for strategic and active risk. Whilst the vast majority of pension funds have taken on both strategic and active risk in the typical peer-group benchmarked balanced approach, there is now greater flexibility for funds to tailor this mix through the use of index-tracker funds and market-neutral investing strategies.

We have provided indicative costs of each of these strategies in the table. The range typically relates to the size of the investor with larger investors paying lower fees as a percentage of funds under management. However, for the market-neutral strategy this reflects the typical performance fee structure of these funds and the difference between portable alpha (low) versus long-short (high).

4. An analysis of the current position

According to the widely used WM and CAPS surveys, between 65 percent and 80 percent of the assets of UK pension funds were invested in equities as of 31 December 2002.

There is less data available on the levels of active risk used within typical pension funds. However, among clients of the working party members the levels of plan level risk from active management vary from close to zero (a 100 percent index-tracking strategy) to about 2 percent (all invested with one active manager). We believe this is typical (certainly for larger schemes with segregated arrangements) and that a level of active risk much higher than 2 percent at a plan level would be unusual.

Implications of current asset allocation and use of active management

Consider a pension fund with 70 percent invested in equities and with a typical active risk level of 1 percent a year:

1. Bonds are an approximate match for the liabilities of a typical pension plan, and almost all of the strategic risk will come from the investment in equities.

2. Equities have volatility (i.e. standard deviation) relative to pension fund liabilities of approximately 13–18 percent a year.

3. The volatility of the assets relative to the liabilities would therefore be on the order of 9.1 percent to 12.6 percent a year.

4. The volatility from active management is 1 percent a year but, assuming the active and strategic risks are uncorrelated, this only increases total volatility to 9.2 percent to 12.8 percent a year—i.e. substantially the same as the policy risk alone.

Why is the active risk so low relative to the "policy risk" from the strategy of investing in equities?

There are a few possible explanations for this:

1. Plans are concerned with their competitive position and this influences their strategy. In effect they are concerned with the risk of underperforming their peers rather than losing money relative to the liabilities. They are more averse to active risk than to strategic risk and are happy to take on the same level of strategic risk as other funds.

2. Plans are expecting a much higher return from equity investing than they are from active management. On average, active management adds no value, whereas economic advances can be expected to give a positive equity risk premium. Plans may not believe they can identify active managers that will deliver positive net active performance.

3. There is insufficient active risk available, and it is diversifiable. As you increase the level of active risk for a given manager (assuming they can only take long positions), the information ratio will tend to reduce[4]. If you invest across several active managers, the overall active risk level is quickly diversified.

4. Due to a lack of clarity in the definition of investment risk in the past, the policy risk (and hence total risk) may be unintentionally too high.

5. The more explicit measurement of active performance over the short-term has resulted in low levels of active risk due to myopic risk aversion.

We can use mean-variance optimisation techniques to develop some insights into the first two of these possibilities.

Higher risk aversion to active risk?

One way to look at this problem is in terms of a general utility function (see Waring et al).

Utility = Return – risk aversion * variance of return

If we assume a separate risk aversion to active risk and policy risk, we can derive some possible values for the risk aversion by finding the maximum utility (see Waring et al for further details).

It turns out that for maximum utility the policy risk aversion is equal to the policy return divided by 2*policy variance. So for a fund that is expecting equities to outperform bonds by 4% a year[5], with 70% in equities (a total policy excess return of 2.8% a year) and a total policy risk of 10% a year, the risk aversion to policy turns out to be 1.4.

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4) This working party's paper in 2001 discusses this issue in more depth (see Brooks et al).

5) We do not wish to get into a debate on the prospective equity risk premium here. We have used an assumed 4 percent (arithmetic) equity risk premium as this equates to a geometric risk premium of 2.8 percent, which is broadly in line with the median view in industry surveys.

We can do a similar calculation for active risk aversion. For a fund expecting active outperformance of 0.4% for 2% active risk, their risk aversion to active risk turns out to be 5.

We are expecting a ratio of excess return to risk of 0.28 for policy and 0.20 for active returns. That is even though we are expecting equity investing to be a more efficient source of returns than active management, the higher risk aversion derived to active risk implies that the plan is much more worried about taking on active risk than policy risk.

Low expected return to active management

An alternative way to use the same result is to derive how much active return is implied for the risk aversion to be the same (in our example 1.4).

Based on our example of a 2 percent active risk and a 4 percent equity risk premium, the expected active return would need to be 0.11 percent a year to imply the same risk aversion to active risk as to policy risk. The implied ratio of active return to active risk (i.e. the information ratio) falls to 0.06.

This example suggests that if a pension fund believes that their active manager(s) can deliver a (net) information ratio in excess of 0.06, then the level of active risk should be increased. Given the diversification benefits from employing multiple active managers, even lower levels of net information ratio would be sufficient from each manager[6].

Insufficient active risk available

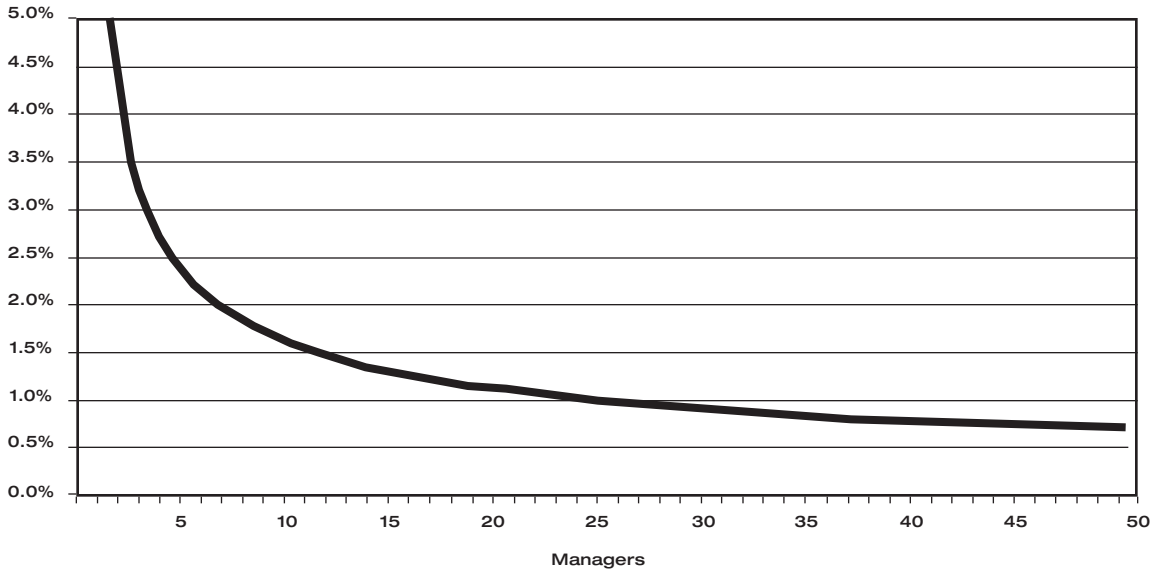
Once a plan is sufficiently large to consider multiple managers, the active risk level rapidly drops. For example, a plan appointing five uncorrelated 5 percent risk managers for 20 percent of the portfolio each will have a total active risk of a little over 2 percent. The change in risk level with an increasing number of managers (assumed uncorrelated and each with 5 percent active risk) is illustrated below.

To achieve higher levels of active risk, plans will need to look toward long-short investment strategies—this has the added benefit of increasing the efficiency as any positive information ratio will not necessarily reduce with increasing risk.

5. Market-neutral investing[7]

Whilst a pension fund can vary the level of strategic risk being taken by varying the allocation to equities,

How active risk varies with number of managers



6) This has interesting ramifications for measuring the success of a manager. Whilst fund objectives may target information ratios of around 0.5, this type of analysis suggests that almost any level of net outperformance over the long-term should be highly valued.

7) Jelicic and Munro provide a more detailed report on market-neutral investing.

8) Although we focus here on market-neutral investing in equities, it is important to note that market-neutral techniques can be used in any type of asset (e.g. bonds, currencies, commodities) to add value without introducing any systematic risk to the portfolio.

it is more difficult to vary the levels of active risk, especially if the fund does not want to take on any strategic risk. In this situation, a market-neutral strategy is required, either using portable alpha techniques or long-short investing[8].

Portable alpha

The portable alpha approach allows the pension fund to receive a return that is equal to the outperformance from an actively managed portfolio plus the return on their desired base asset (e.g. cash, gilts, corporate bonds, etc) with the equity risk being hedged away.

In practice, the implementation of this strategy would involve investing in a long-only equity fund and having a swap overlay which returned the difference between the fund's equity benchmark and the base asset.

Long-short investing

A genuine long-short approach involves the manager holding favoured stocks whilst short-selling stocks that are expected to underperform. The portfolio is market-neutral if the long portfolio and the short portfolio are of equal weights (or more precisely of equal market exposures).

Advantages and disadvantages of the two approaches

Long-short investing benefits from not having to take positions relative to an index benchmark. This has a number of advantages:

- It provides greater scope for managers to add value through shorting stocks. Within a long-only or portable alpha approach, the manager can only underweight a stock by its weight in the benchmark. With a genuine long-short portfolio there is no such restriction.

- All positions directly reflect the manager's views. With a long-only or portable alpha approach, there will be a tail of stocks that the manager does not hold and hence is underweight without necessarily any strong view.

- The potential alpha can be geared up directly and efficiently by gearing up the size of the positions (assuming liquidity allows), e.g. doubling all of the positions doubles both the risk and the potential alpha, leaving the information ratio unchanged. With a long-only or portable alpha approach, the information ratio reduces with increased levels of risk.

Against these theoretical benefits, many investors have concerns over whether long-short funds can genuinely deliver good long-term performance given their relatively short history, high fees, lack of regulation and transparency, and typical emphasis on short-term trading.

In contrast, portable alpha is a relatively simple way of taking a manager's proven long-only strategy and hedging the market risk. This may be an attractive option to pension funds who have a strong conviction in a manager's long-only performance but want to reduce strategic risk.

6. Place Your Bets

The relative merits of strategic and active risk are summarised in the table below.

Strategic Risk	Active Risk
• Positive equity risk premium implies risk likely to be rewarded over the long-term	• Zero-sum game, but.... • ... pension funds may have advantage in accessing "alpha" • ... risk return trade-off superior if skilful managers can be identified
• Costs of up to about 10 basis points (based on passive investing)	• Cost between 20 and 200 basis points depending on size and nature of fund (i.e. higher for long-short)

In our view, there is no clear winner, and whilst we yearn for a mathematical answer, the reality is that the decision will be down to the subjective views of the trustees and their advisors who will face a number of difficulties in making their decision:

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- While equities have outperformed bonds by 5 or 6 percent over the past 100 years, most forward-looking estimates are in the 2 – 4 percent range.

- Alpha is difficult to predict. Most studies find that past performance does not provide a useful indicator for future outperformance. However, whilst investment consultants tend to focus on more qualitative aspects of investment managers (such as people, process and stability of business), recent short-term performance still has a significant impact on the decision-making process for most trustees[9].

Hodgson et al discuss the range of behavioural biases that impact the trustees' decision-making process and estimate that almost half the decision-maker's attention is focused on these biases. Issues that are of particular relevance to the active versus strategic risk balance include:

- The trustees' previous experience of active management.

- The desire to avoid regret risk by adopting similar policies to other funds. It is common practice to adopt significant strategic risk, whereas it is rare to invest significant amounts in long-short funds. A decision to invest in equities is therefore less likely to be criticised if it backfires than a decision to invest significantly in aggressive active management.

The level of investment expertise of the trustees and the amount of time that they are able to devote to the investment policy will also have a crucial bearing on the end result. The Ontario Teachers pension fund (see De Bever et al, (2000, 2003)) provides an interesting case study of how more complex risk budgeting structures can be adopted.

7. Future directions

In the last couple of years there have been some signs that the herd has been dispersing as trustees pay greater attention to investment policy, largely as a result of the Myners report. This will lead to a greater diversity of investment policies rather than the one-size-fits-all peer-group benchmark.

The move away from the peer-group benchmark has been coupled with a general feeling that active mandates should be more long-term and less focused on market indices. The recent competition run by the Universities Superannuation Scheme (USS) and Hewitt Bacon and Woodrow typifies this view.

The trend to long-term, liability-based benchmarks certainly helps focus minds on why the assets are being held. It should also result in an increase in the level of active risk being taken and remove the situation where an active manager is (implicitly or explicitly) forced to hold a significant position in the likes of BP and Vodafone, regardless of their view on the stock, for "risk reduction purposes." Trading costs could also fall as there is less short-termism and rebalancing to stay within tracking error limits.

However, the industry has been here before and needs to be wary of the pitfalls that befell it previously. In particular, the search for a suitable measure

9) If institutional investors can subdue this behavioural bias, then this may provide an underlying rationale for why they can outperform whilst retail investors chasing the hot funds underperform.

of success for managers led to the peer-group benchmark, and natural risk aversion (on the part of both trustees and managers) led to herding around this benchmark. There are a number of issues that therefore need to be addressed with such a mandate:

- What is the split between equity risk and active risk? Who decides on the amount of equity risk to take? If it is the manager, then what risk guidelines are they given?

- How is success measured and rewarded? An absolute or liability-based return target may be inappropriate if discretion for the equity allocation is not within the manager's remit[10].

- The loosened constraints will lead to a far higher risk of large underperformance especially over short periods (e.g. 3 years or less). Can the trustees overcome the natural inclination to look at short-term performance? Will they be able to turn a blind eye if the manager underperforms by a large amount over 3 years?

Regardless of the investment approach adopted, one of the key messages from this paper is that pension funds should endeavour to ensure that the investment risk budget is clearly defined and that the risk-return trade-offs of different investment decisions are understood. There is no one-size-fits-all solution to investment policy—appropriate strategies will range from 100 percent in bonds to 100 percent in equities and from fully passive to aggressively active.

Appendix: Distinction between strategic risk and active risk

Typical bespoke benchmarks comprise a set of weights ascribed to various standard security market indices. The benchmark will also usually include a rebalancing regime, e.g. the benchmark is assumed to be rebalanced monthly, or quarterly, or according to some range limits, etc.

The perception is that if the fund invests fully in line with the benchmark, they will then be exposed only to systematic or pure market risks, which in turn is often perceived as being the 'theoretically correct' position. However, these perceptions are usually mistaken because:

- The index for any particular asset class may represent a mismatch relative to 'the market' of that asset class.

- The overall underlying 'market' may be different from the weighted aggregate of the indices.

- The rebalancing of the benchmark and the rebalancing of the fund are often disjointed.

Index and market mismatch within the asset class

The stylised interpretation of modern portfolio theory is that investors should invest in the market and lever their risk up or down by borrowing or investing in risk-free assets. In one sense, 'the market' represents a sensible starting point for comparing the performance of one's investments.

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10) There may be a perception that over a period as long as 10 years this will even out. In practice this is far from the truth.

However, practical issues have made the definition of 'the market' somewhat hazy and, more pertinently, different from the theoretical notion of 'the market'.

The market as defined in theory contains many assets that typical investors are unable to acquire, even when an exchange exists. Active investment managers have therefore pressurised index providers to create indices of investible assets—an example of this might be the free-float indices. In one sense this is 'fair' since the benchmark is otherwise unattainable by the investment managers.

On the other hand, it can make the comparison 'unfair', not only because the index no longer represents the underlying market espoused by theory, but also because the assets are priced taking into account the fact that not all the shares of a security are traded. This mismatch of pricing basis and performance measurement basis might lead to easy pickings or, conversely, an impossible task for active managers.

Furthermore, in some highly concentrated markets, individual stocks dominate the market and it is difficult to claim then that a fund invested in the index is not exposed to stock-specific risk. Managing money against such an index can lead to decision-making becoming more focused on how a stock will perform against the largest constituents in the index, rather than any exploitable inefficiency in the pricing of the stock. Some alternative indices, such as the multinational and local indices, do deal with these issues albeit somewhat indirectly.

Overall benchmark and overall market mismatch

Apart from individual indices not perfectly representing the individual asset class markets, there is another source of mismatch that manifests itself at the aggregate benchmark level.

This source does not rely at all on the individual indices being inappropriate, but rather on the fact that typical benchmarks are not market-weighted aggregates of the asset classes. For example, in UK DB pension schemes, scheme benchmarks often have 30-50 percent of their funds invested in UK equities, even though the UK market represents less than 15 percent of the capitalisation of the world's stock markets, let alone all the other assets.

If we assume that there are multiple systematic risks (pricing factors) in the market, then any particular combination of indices other than a strictly market-weighted combination will mean that the systematic risk exposures are likely to be tilted away from the market exposures. These tilts generate a 'tracking error' relative to the whole market and a practical question arises as to whether these tracking errors should be considered an element of 'active' risk, or systematic risk.

Arguably, risk should be decomposed into:

a. (market vs. minimum risk portfolio) risk +

b. (benchmark vs. market) risk +

c. (portfolio vs. benchmark) TAA active risk +

d. (portfolio vs. benchmark) stock selection active risk.

The second component (b) is rarely if ever acknowledged, let alone measured. There are, of course, many practical reasons that make it very difficult to measure (b) quantitatively. These include the difficulty in specifying exactly what the market is since it should strictly include a whole lot of untraded assets, as well as the thorny practical and theoretical issue as to how much of that market exposure should be currency hedged.

There also remains the issue of how to take into account other risks that may not be reflected in the market—for example, there is conceivably a risk in investing away from the domestic market because any political or regulatory changes within a country may give preferential treatment to domestic investors at the expense of overseas investors. In other words, there should be a natural home bias in order to mitigate non-economic and non-financial risks.

Rebalancing issues

A final practical issue that makes the distinction between active and strategic risk confusing occasionally is the timing of any rebalancing specified in the benchmark. Although the rebalancing between equities and bonds (where bonds proxy the liabilities), is a non-contentious way of keeping the risk relative to the liabilities reasonably constant, it is less clear how, for example, rebalancing within the equity portfolio should work.

The market itself, of course, does not 'rebalance' and in most bespoke benchmarks there is little or no attempt to rebalance the individual stock weights to be the same as they were when the index was incorporated into the benchmark. However, there is usually a rebalancing of the geographic or sector weights. So, for example, the benchmark may be rebalanced each quarter so that there is 50 percent in UK equities, no matter how the individual stocks within the UK have performed. Any manager attempting to manage this on a global basis will have to take into account some fairly complicated offsets in order to maintain the same risk/reward profile over time as the benchmark changes character.

References

Brooks, Bowie, Cumberworth, Haig and Nelson. 2001. "The Practicalities of Budgeting, Managing and Monitoring Investment Risk for Pension Funds," Investment Risk Working Party, Faculty and Institute of Actuaries Investment Conference.

De Bever, Kozun, Viola, and Zvan, 2000. "Pension Risk Budgeting: Something Old, Something New, Something Borrowed…," *Journal of Performance Measurement*, Summer.

De Bever. 2003. "Risk Budgeting," Presentation to 2003 NAPF Investment Conference.

Exley, Mehta, and Smith. 1997. "The Financial Theory of Defined Benefit Pension Schemes," BAJ.

Hodgson, Breban, Ford, Streatfield, and Urwin. 2000. "The Concept of Investment Efficiency and Its Application To Investment Management Structures," paper presented to the Institute of Actuaries.

Jelecic and Munro. 2000. "Market-neutral investing," paper presented to the Faculty and Institute of Actuaries Investment Conference.

Speed, Bowie, Exley, Jones, Mounce, Ralston, Spiers, and Williams. "A note on the relationship between pension assets and liabilities," SIAS.

Urwin, Breban, Hodgson, and Hunt. 2001. "Risk Budgeting in pension investment," Actuarial Working Party.

Universities Superannuation Scheme (USS) and Hewitt Bacon and Woodrow. 2003. "Managing Pension Fund Assets As If the Long-Term Really Did Matter," Investment competition, www.usshq.co.uk (Special Interests Groups, Competition).

Waring, Whitney, Pirone, and Castille. 2000. "Optimizing Manager Structure and Budgeting Manager Risk," *Journal of Portfolio Management*, 26(3).

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