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Strategy for Investing Surplus

by David N. Ingram

Insurance companies, in general, have not placed particular focus on how their surplus is invested. The trend has been to allocate surplus into the product portfolios to the extent that there is a RBC or internal required surplus target for the product. Many companies have parents that make sure that there is little additional capital available. When there is additional surplus, it has generally been invested in one or more asset types not seen as appropriate for backing liabilities, such as equities or real estate.

The emphasis on increasing company surplus, which started with the high-profile company failures in the early 1990s and, for some companies, the shift to variable products, has led to the buildup of significant "excess capital" in some companies—hence the need to develop a strategy for investing surplus.

A surplus investment strategy for a company can be developed from these three principles:

- The surplus investment strategy should be based on the risk/return preferences of the client, just as with any other portfolio strategy decision. Here the client is some combination of management, the board, and shareholders.
- All surplus should be considered open to this process. While it is fundamental that a company has one or more asset pools equal to the liabilities, the attribution of surplus to products is a choice made to facilitate surplus management and financial reporting. Asset liability management and valuation actuary opinions deal with asset pools equal to liabilities. Required surplus invested in the portfolios is quite often invested very conservatively, reducing risk but not necessarily improving the risk/return profile of the company. Bringing the entire surplus investment strategy out of product lines and into corporate arena allows the company sufficient flexibility and bulk to have a significant impact on the risk/return profile of the company through the surplus investment strategy.
- The surplus investment strategy should be developed in the light of all

company risks, especially all product risks. Product risks should be determined after the application of asset/liability management techniques to optimize each product's risk/return characteristics. Thus, surplus investment strategy can be developed so that it complements the product risks in a way that coincides with the risk/return preferences of the client. If the product risks emphasize interest rate risk, management can choose to avoid interest rate risk with surplus investments or to emphasize more interest rate risk if it particularly favors the return possibilities associated with those risks.

Other constraints that often seem to dominate this type of discussion have been deliberately left out at this point. They include statutory investment restrictions, RBC constraints, and rating agency leanings. It will be a useful exercise to see where a unfettered analysis of what should be done to maximize returns for the level of risk acceptable by the company would lead. The results can then be modified to conform with the other constraints if necessary.

Inherent in this process is the need to systematically quantify the various risks. Two general processes come to mind. The first I will call "Asset Substitution." In the asset-substitution process, each asset/liability portfolio would be modeled as one entity. A set of typical investments would then be developed to replicate the profit and loss streams expected from the asset/liability portfolios. That is, the substituted asset portfolio, if held directly, would produce very similar results in terms of profits and losses to the company. The process of formulating surplus investment strategy would then proceed as any other portfolio strategy discussion. This approach has particular appeal if the ultimate decision making is to be done by the chief investment officer, because it puts everything in terms that are most familiar to an investment professional.

Putting together the substitute assets is a revealing process in several ways.

First, the combination of investments needed to replicate the risk return characteristics of the products may provide interesting insights to the risks of each product. Second, the magnitude of the portfolios may be very surprising. A company with billions of liabilities and millions of surplus may not think that the surplus investment decision is an extremely important one and may find that substitute assets are of a fairly similar magnitude to the surplus of the company, making the surplus investment decision just as important as product pricing and profitability decisions.

For example, consider a variable annuity portfolio of \$10 billion. The product has a gross margin of 125 basis points and annual expenses of \$100 million, including amortization of DAC. The expenses could be replaced by debt of \$1.25 billion with an 8% interest cost.

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In the short term, the gross margin could be replaced by an HTM [1] bond of \$1.5625 billion at 8% and a stock portfolio of \$125 million. (During the next year, the company will collect 1.25% on the \$10 billion of account values plus 1.25% of the gain or loss in the account values. You can think of this as a guaranteed revenue of \$125 million, hence the \$1.5625 billion bond, and a stock portfolio equal to 1.25% of the account values.) If you believe that the terms and characteristics of the debt representing the expenses and the bond representing the base revenue are essentially the same, they can be offset producing a substitute asset portfolio of a \$312.5 million HTM bond and a \$125 million stock portfolio. Quite a difference from \$10 billion of stock market-based liabilities.

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There are at least two additional considerations for this product. If you are looking at a longer time frame than one year, the stock market returns compound and therefore the substitute stock portfolio grows. This could be dealt with by using a substitute stock asset that mimics the average equity exposure over your time horizon or by using a more complicated series of investments. The second additional consideration is the expected impact of a stock market downturn on surrenders. If you believe that poor stock market results will lead to increased surrenders, the allocation between the HTM bond and the stock portfolio needs to be adjusted in favor of the stocks. The amount of the adjustment depends on how sensitive you think that surrenders will be to stock performance.

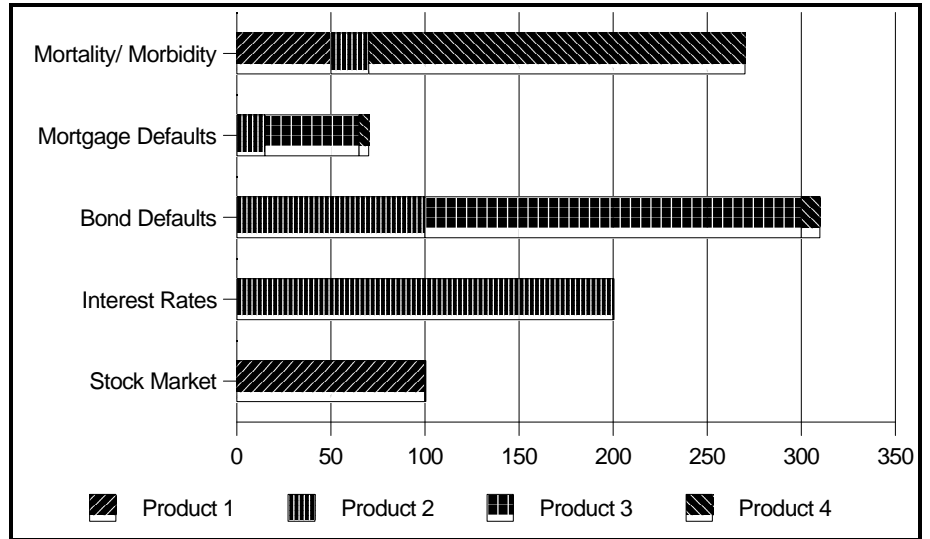
Similar thinking can be applied to most products to produce substitute assets. An SPDA portfolio, with its short straddle characteristics, would be modeled by some combination of bonds in a trading portfolio and interest rate options which would lose money when rates fell. C-2 risks could be substituted by commodities futures where there is a possibility of constant statistical fluctuations and rare disasters.

Once the substitute portfolio is constructed, the current surplus investments could be combined and the portfolio stress tested in various ways until the risk return characteristics can be made clear to the client. To the extent that the risk return profile of the combined substitute portfolio and surplus portfolio does not fit the desired risk return profile of the client, adjustments can be made in the surplus portfolio. If you try this type of calculation, you may

be surprised by how similar in size the substitute portfolio and the surplus portfolio can be. This shows the vital importance to company risk management of the investment strategy of the surplus portfolio.

The second method of quantifying the company's risk is to use a variation on the VAR (value at risk) idea. With VAR, day-traded assets are evaluated in terms of the negative tail of their distribution of possible values over a time period of several days. VAR is often defined as the loss experienced at the 95% confidence interval. All risks are brought together into the VAR calculation, necessitating a knowledge of the correlation between the risk factors that have an impact on the value. The September 1997 *The Actuary* contains an article on VAR by Harry H. Panjer and Harry S. Panjer.

FIGURE 1
Product EAR



It is troublesome in several ways to apply the VAR concept "as is" to insurance company risks. First, most insurance company risks are not valued daily and cannot be unwound quickly. At many companies, "value" is not a concept that creeps often into management decision making. On the other hand, "earnings" are a hard reality that drive most corporate decisions. Therefore, I suggest the use of "earnings at risk" or EAR as our risk measure. The time period for measurement of EAR should be either quarter or year, whichever gets the most emphasis in the company. The confidence interval can be 95% or 99%. For the purpose of looking at surplus strategy, I also suggest that the risks be looked at separately. There is just not sufficient data to calculate accurate correlation coefficients among most of the

risk factors of insurance companies. Then the problem of insufficient correlation data for some risks can be ignored. This may also lead to a better discussion of the results by focusing on each risk factor separately.

The person doing the EAR calculation can work

TABLE 1
Product EAR

	Average Earnings	Stock Market	Interest Rate	Bond Defaults	Mortgage Defaults	Mortality/ Morbidity
Product 1	75	100	0	0	0	50
Product 2	100	0	200	100	15	20
Product 3	125	0	0	200	50	0
Product 4	90	0	0	10	5	200
Surplus Bonds	10	0	50	25	-	-
Surplus Stocks	15	50	25	-	50	-
Surplus Mortgages	12	-	-	-	-	-

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with the valuation actuary to determine the 95% worst scenario for each product portfolio for each risk factor. Often, this will mean looking at the scenario at the 5% tail of the distribution of scenarios. For instance, if rising interest rates cause losses, often a greater increase causes greater losses. Therefore, it may be possible to look at the rising interest rate scenario at the 5% tail of the distribution of interest rate scenarios and then calculate the loss for that scenario. Portfolio managers can also provide statistics of that type.

When the calculations are complete, they can be put into a chart similar to Table 1 on page 4. The table could be graphed (Figure 1) to better illustrate the relative magnitudes.

After looking at this figure, this company could want to emphasize either mortgages or stocks with its surplus

investments if it wants to complement its product risks.

There is a third way of dealing with this question that a few companies are using. In the style of banks, they are modeling their assets and liabilities completely separately and then looking at the risk-return profile of the resulting combination. For this process, there is no specific distinction made between assets backing liabilities and surplus. The strategy for investing surplus is therefore implicitly determined in a way that conforms with our three principles.

Finally, a comment on line-of-business reporting. The product required surplus and earnings thereon are included in determining earnings and equity of each line of business so that the ROE calculation for each product line is determined correctly to reflect current-year activity and the full impact of the product line on the entire enterprise.

Product line managers and actuaries may want to determine their own strategy for investing surplus. The product pricing may be based on a certain expected investment strategy and results from the investment of required surplus. In this case, the company may have to decide between optimizing the risk return profile of the entire company and the product line financial results.

END NOTE

1. HTM means "hold to maturity." It's an AICPA term for classifying bonds for marking them to market. HTM bonds do not have to be marked to market because the holder does not intend to take them to market.

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It's Different This Time

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- Demographic changes have promoted an excess of savings over spending.
- The expectations that any serious economic events, such as occurred in Mexico a few years ago and Asia lately, can be supported through bail-out packages through such organizations as the International Monetary Fund (IMF).

Unfortunately, human behavior has not changed. Greed can drive prices to excesses, and fear can drive prices to extreme lows. We have seen both sides of the spectrum in the past 12 months in the Asian economies and markets. And until recently, complacency artificially drove up asset prices all over the world, reducing expected returns and the so-called "risk premium." This lack of risk recognition was often referred to as liquidity, conjuring up the notion that investment activity was now safer—not that risk was just being unwisely assumed or underpriced (but there may have been simply no other place to park investment funds).

Why Things May Be Different This Time

Anyone who follows investment markets eventually realizes that the markets can never be fully understood. I often like to picture the stock market as a dragon looking for a way to kill its potential slayer. Markets find ways to deceive and trick even the most cunning and savvy professional. Now that central banks worldwide believe that they have gotten monetary policy under control and have beaten inflation, they begin to sense that they may have been fighting the last war. Deflation, which has never been directly fought and successfully beaten, may be a real possibility. It has crippled Japan in the 1990s; it is now killing the rest of Asia; and it battered the whole world in the 1920s. Some claim that only World War II saved the world from the ongoing depression.

Ironically, too much money to invest can lead to problems. As occurred in Japan in the late 1980s and the Far East in the early 1990s, if too much money is available to invest in projects, plants and factories (infrastructure), we could reach a point at which the

vigorous economic activity generates more product supply than product demand. Even if prices fall in order to stimulate demand (potentially causing deflation), the fall in prices may reach a point where it is no longer possible to pay back loans or provide a reasonable return on investment for shareholders and financiers. This will cause investment to dry up as return prospects diminish. Unfortunately, however, the strong yen policy supported by the U.S. and Japan over the past few years (a policy at least partly aimed at limiting the amount of Japanese trade surpluses incurred at the cost of the U.S.) has helped to exacerbate the problem.

As Japan has seen, lowering interest rates in the old Keynesian style to stimulate the economy does not solve the problem, as overcapacity can remain for a very long time (long-term nominal bond yields in Japan have been in the 1–2% range for quite some time). If Asia is able to export its goods and services to North America (and at cheap prices, helping to keep the U.S. rate of inflation and wage escalation rate low),

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