Chapter V

ADVISING MANAGEMENT ON SOLVENCY AND SOLIDITY

Section 1: Operating within a Changing Valuation Perspective

Traditionally, valuation has been a straightforward process. Using conservatively loaded valuation tables, determining reserves was reduced to a mechanical computation which did not vary from year to year, except with the occasional change in reserve standards, new mortality or morbidity tables or valuation interest rates and subsequent issue of new policy series. The valuation process from the management perspective insured that the computation process went on in a smooth and timely manner and that the underlying records were accurate. With the introduction of high-speed computers, most of the concern in this area was alleviated.

Valuation had become primarily an accounting problem, albeit one with a distinctive insurance flavor, and was subject to the pressures associated with accounting conventions. The reserve method chosen for a new policy series often turned on the prevailing tax climate, and tax considerations were never out of mind when reserves were strengthened. Conversely, if the level of new sales proved an undue strain on surplus, relief could be obtained through the adoption of the CRVM reserve standard. It did not take an actuary to approve decisions based on sound business principles. The emphasis was on maintaining attractive statutory, GAAP or modified GAAP financial statements. Management had become adept at explaining the sometimes confusing numbers which resulted. The underlying reserve standards were considered conservative enough to cover all but the most severe experience and, if surplus levels were sufficient, the company should be able to weather anything.

What constituted sufficient surplus was determined primarily by marketing concerns and the necessity of maintaining a good "rating." Surplus targets set by relatively simple formulas with the marketplace in mind provided the amounts notionally earmarked to cover adverse experience. It was comforting to know that market-driven surplus levels would in fact have covered the most drastic of asset default experience or mortality fluctuation. As long as it was generally agreed that statutory reserve levels sufficiently covered the risks involved, there was no need to actually identify surplus or reserves with specific assets. Consequently, there were no means to accurately determine their adequacy.

With the recent dramatic increase in interest rate volatility, perceptions about reserve adequacy or surplus sufficiency have turned around. Widespread disintermediation has shown that book value surrender guarantees can pose a risk to solvency not covered by the traditional reserve standards. New products designed to satisfy the consumer's appetite for high guaranteed returns have exacerbated the risk. The sudden importance assigned to the interest rate risk uncovered a weakness of traditional valuation measures. Book value was less important as an indicator of solidity than overall cash flow. This realization led to the call for modern methods of analysis to certify that reserves are held in investments suitably matched, given reasonable reinvestment assumptions, to provide for guarantees.

In this revised framework, reserves become more than accounting entries, and the role of surplus as a contingency reserve is made explicit through multiple scenario testing. Testing in a realistic environment reveals the existence of complementary cash flow patterns that may develop among products or lines to act as implicit hedges reducing net exposure. Adequacy of reserves and surplus

in this revised setting can no longer be determined by comparison with reserve factors or surplus formulas, but must be demonstrated by a careful consideration of the assets and liabilities involved under a variety of economic scenarios. The tools presented here as an aid in the actuary's work extend naturally to provide answers to questions of product design, investment mix and overall growth objectives.

Sound business judgment now requires a greater degree of risk management through product diversification and compatible investment policy. The actuary will be called for advice on the soundness of risk management. This new analysis emphasizes methodology, but has not fundamentally changed the goals set for surplus management. It has brought a new realism to the task of measuring surplus needs which has implications for management and pricing. After all, the purpose surplus is held must ultimately guide its allocation and set pricing standards for its development.

Section 2: Surplus Layers

In discussing some of the implications of new methods for setting surplus policy, it is useful to consider surplus as existing in several layers which have been identified through scenario testing with specific invested assets. These layers not only attempt to quantify the corresponding risk, but also provide guidance in selecting the asset mix which should comprise that layer. Together

with policy reserves identified with specific invested assets, surplus layers are to serve four roles:

1. Market Value or Cash Flow Surplus: Assets required in a contingency to supplement reserves in maturing all existing policy obligations.
2. Solvency or "Book" Surplus: Assets which, together with Market Value Surplus and basic policy reserves, are sufficient to bring the total book value to minimum statutory levels throughout the scenarios tested.
3. Solidity Surplus: Additional surplus held to fund new sales and maintain a continuous cushion in excess of legal requirements.
4. Vitality Surplus: Assets available to fund new growth or back new ventures.

The overall level of available surplus is ultimately determined by profit margins allowed in the marketplace. Within that constraint, it is management's goal to maximize the surplus held at the third and fourth levels to fund new growth. The actuary's concern is that adequate surplus be held in the first two levels to cover risk. This structure reveals a potential for stalemate that may only be avoided if both sides work together to determine which actions -- modifying investment policy, redesigning product guarantees or diversifying the product mix -- may free surplus from the first two levels to fund further growth. Each company must examine the structure of its surplus in light of its distinctive limitations and goals.

2.1 Market Value Surplus

This purely economic measure, also called "cash flow" surplus, expresses the actuary's primary concern that sufficient additional assets be set aside to mature all existing obligations under adverse experience. This single measure gives the potential cost or amount at risk, given the existing degree of match or mismatch between the liability and asset cash flows. Applied to interest-sensitive liabilities, this measure can only be taken under the assumption of future interest rate paths or scenarios. In a realistic investment setting, it extends naturally beyond the interest rate risk to allow study of the time-dependent nature of the other major risks, asset defaults, mortality fluctuations or general pricing inadequacy.

A wealth of information is made available in this process. At each duration, the market value based on cash flow projected forward from that point measures the exposure if the environment remains fixed at its current level. Whereas a scenario may call for a changing environment with cyclical interest rate patterns, for example, the market value determination at each intermediate point uses the fixed yield curve specified for that duration to project values into the future. At the end of each run, then, not only is it known whether sufficient funds were available to survive that scenario, but also whether survival could have been achieved had the environment remained fixed at any of the intervening levels. This last point is important in that it relates to the market's judgment of continuing viability at each intervening point in the scenario. Thus, even if survival seems assured over an initial set of testing scenarios, and if the market value at any duration becomes negative for any of the scenarios in that set, then a new scenario has been identified over which survival, at least in the market's opinion, is doubtful.

It should be clear that this layer has an alternate characterization of particular significance to management. If surplus falls below this level, management has identified a scenario that poses a risk of ruin outside its control. With surplus above this level, management has some flexibility to stave off potential technical insolvency or meet near term cash needs by restructuring its asset or liability portfolios. This could be accomplished, for example, with a program to realize capital gains where possible or to accelerate the profit recognition of products through a reinsurance program. With surplus below this level, however, there is no hope of surviving the scenario. In a sense, if diversification can lead to a lower level of surplus, the "market value" surplus requirement determined here measures the non-diversifiable or non-insurable component of risk assumed by the company.

The methods and considerations involved in this determination have already been covered in the preceding chapters. It is important to recall, however, that surplus funds determined in this manner are to be identified with specific invested assets, with determinable cash flow characteristics or market value. Further, the test at this level does not relate to any accounting convention, but rather is intended to reflect the market's judgment of ultimate cash flow adequacy.

The actuary is not charged with advising that each line or product be allocated sufficient surplus to get it through its own worst scenarios. The test is meant to be applied to the company as a whole. Different lines or products will exhibit varying degrees of strength or weakness in a given scenario, and the "worst case" scenario for one may not be the same for others. Amounts held in surplus will have more utility than similar amounts locked in multiple separate

statutory reserve items. It follows that efforts to relegate these amounts to a basic statutory reserve status should be resisted.

2.2 Solvency Surplus

After determining that sufficient surplus has been set aside to cover the maximum economic loss possible on existing business, the potential for statutory insolvency may still remain. There are two reasons for this. First, the generally conservative nature of statutory reserves insures that margins are available to cover experience worse than may have been expected in pricing. Unfortunately, those margins are not readily available for use on the occurrence for which they were designed. In the absence of specific statutory relief, these conservative reserve margins must be maintained throughout the most severe economic cycles if the company is to survive as a going concern.

One example is the excess interest reserve required today for many guaranteed interest products. These amounts cannot be drawn down to meet guarantees without triggering insolvency; contingency needs must therefore be met out of surplus set aside for this purpose. To the extent that cash flow management has been practiced for these products, however, cash flow risk has been minimized. Although this conservative management style cannot be reflected in the level of excess interest reserves held, the actuary should take this into consideration when passing on the amount and quality of the assets forming any additional surplus backing. Product managers who do not receive recognition for their efforts at cash flow matching in reduced surplus requirement may even be tempted to seek higher returns on their surplus backing through deliberate mismatch.

The second reason why additional surplus must be held in a solvency layer concerns the role future profits played in determining the market value of the existing block of business in layer one. In determining the market value surplus level, the net liability cash flow would have included any future profits that could realistically be expected to materialize after an initial period of strain. Although this is realistic from a market value or cash flow perspective, it has the effect of implicitly offsetting current obligations with future profit streams. The actuary is not allowed to take future profits into consideration when checking for projected technical solvency and therefore may determine that in order to realize those future profits, the company requires additional surplus to survive the initial statutory strain. Whatever the reason, the company may be judged economically viable or even healthy in the marketplace, though in danger of becoming technically insolvent on a statutory basis.

If appropriate surplus has been held to cover the market risk, the remaining concern addressed at this level is of an accounting rather than economic nature. To avoid being forced to restructure its assets or seek relief through reinsurance on unfavorable terms, the company should hold additional surplus upfront to provide supplemental asset book values that will continuously meet statutory requirements. It is this additional surplus layer that we refer to as "solvency surplus."

It may be useful to review the process involved in determining the amount and nature of these first two layers. The market value layer was arrived at by adding sufficient assets from the surplus layer to the assets backing policy reserves to make the asset and liability cash flows balance. The assets added here would primarily be fixed income securities, comparable in character and quality to those underlying the policy reserves and assumed in pricing.

The second layer of surplus is determined by continuing this analysis through the same scenarios but with a focus on accounting values. To the extent that accounting liabilities exceed the market value liability at each duration, a "paper" liability exists which need only be covered with assets of equal economic substance. These paper liabilities would include, for example, excess interest reserves to the extent they exceed amounts held for that purpose in layer one, and policy reserves where effectively offset by policy loans and the unearned portion of the dividend liability. With policy values sufficiently protected in the first layer of surplus, a stable projected book value is the primary quality needed for assets held in this second layer. Asset liquidity is not a primary concern here. It is assumed that cash flow requirements have been sufficiently covered in the first layer of surplus, minimizing the potential for possible loss on investments held in the second layer.

The interaction among lines will be an important consideration in arriving at the total market value or cash flow needs. Offsets among lines will be apparent at this second level and should be more significant. This is because in addition to the varying contribution each line makes in a given scenario to the total net profit or loss figure that determines market value, the timing of profits or losses can be critical for maintaining statutory solvency. One line may expect its book surplus to be slowly drawn down through a scenario over which a second line may only need to survive an immediate book loss. The book surplus required upfront to meet the eventual needs of the first line can be used in the interim to cover the statutory needs of the second, while profits which develop later in the second line can offset losses as they emerge in the first.

A line viewed in isolation is unable to count on future profits with book insolvency looming in the near term, and would have a greater "book" surplus need than the same line considered as part of a diversified company. Reserve standards are therefore set conservatively to cover reasonable deviations in experience for each product viewed in isolation. As noted, the contingency funds set aside in the market value layer must be available to meet the broad needs of the several product lines. It becomes doubly important for the surplus in this layer to meet future solvency tests.

2.3 Solidity Surplus

We have emphasized the importance of surplus held to cover extraordinary risks inherent in the existing blocks of business. A major assumption in determining the composition of the first two layers was the company could continue as a going concern even in the face of extraordinary adverse experience. Realistically, management will be concerned that additional surplus be held to fund some base level of new sales in each of the scenarios used in the study. To accurately determine the nature (market or book) of this additional surplus investment, the probable growth patterns for each of the major product lines as they react to the scenarios under investigation are required as input to the process described in layers one and two. The additional surplus funds required to back projected sales activity can again be broken into "market" and "book" components with the same implications for its investment policy. To differentiate these amounts, they are referred to here as Solidity Surplus; that is, the additional surplus investment required to carry out the existing business plan.

The explicit inclusion of new sales in the third layer analysis differs only in degree from assumptions used in dynamically projecting the existing blocks of business forward. A comparison of a guaranteed interest product with one allowing an interest rate reset will illustrate this. Asked to describe the probable behavior of an existing block of business in a rising interest scenario, the manager of the guaranteed interest product will project increased lapse experience offset by an increase in new sales. In effect, products issued at the new higher rates are expected to cannibalize the existing block of business. Contrast this treatment with the behavior described by the second product manager for the product with a rate reset feature: Future credited rates in the same scenario may require an explicit subsidy to keep lapse rates within reason. Both managers recognize the economic cost of keeping business on the books in this scenario. For one product, that recognition took the form of new sales made at a loss, while the second product's subsidy is implicit in its revised pricing. Thus, the line between an existing block of business and new sales is not always easily drawn -- one more reason why a base level of replacement sales may be justified in adding a degree of realism to the behavior of a theoretically closed block of business.

This is not to suggest that surplus is held merely to meet the contingencies of existing and projected business. There is a purely cosmetic reason for holding surplus. For a company to survive and prosper, it must not only be strong, but it must seem to be strong in the eyes of an unsophisticated public lacking information necessary to distinguish surplus quantity from quality. For this reason a company may mandate a minimum level of surplus to be held at all times. This level may be purely subjective, conform broadly to company traditions, or be set with an external "rule of thumb" rating in mind. The

cosmetic nature of this requirement does not lessen its importance to the overall health of the company -- appearances can, at times, be more important than reality. Allowance can, however, be made for the essential "book" character of this need through suitable asset selection.

The amounts arrived at by iterating the scenario testing process for new sales form the minimum surplus backing for each line. Comparison with the amounts determined using the company's traditional surplus formula may indicate areas of over -- or under -- conservatism. The function of this third layer is to set a total surplus cap with which management will feel comfortable and to which the separate lines can manage. The cosmetic function of surplus is of sufficient marketing concern to be factored into setting this third layer.

The first three layers of surplus provide a precise description of the total investment backing each product line and, conversely, provide a more exact measure of the level of surplus to which each product line should be managed. Perceptions of risk change as products and the economy change, and the existence of offsets between lines may alter surplus allocations in unpredictable ways. It would be inappropriate, then, to rigidly enforce an empirically determined measure of risk in product pricing when the forces which determine that risk are largely beyond the product manager's control. Nevertheless, the methodology initially developed to clarify appropriate surplus levels leads to a more realistic view of surplus as an investment at varying degrees of risk. This realization must ultimately be reflected in product pricing and/or growth objectives of the product lines.

This last point deserves further comment. Surplus needs are determined naturally from a mini-max procedure in contrast to the expected value approach normally encountered in insurance pricing. That is, surplus is held at the minimum level necessary to meet the company's objectives during a period of maximum stress. The family of adverse economic scenarios to test existing business provides a boundary for the worst case experience against which this surplus is held but management may wish to add scenarios of its own to that family — especially in planning future growth. The maximum of the surplus requirements over that family of economic scenarios will determine the minimum surplus needed.

2.4 Growth Surplus

The first three layers of surplus cover the amount and nature of the investment required to back existing lines of business to the anticipated level in existing sales plans. Surplus held over and above amounts determined in this manner are available to fund growth over and above that projected in the current sales plan or to fund new lines or new ventures. While the specific economic or book characteristics of each asset were carefully noted as they were added to the first three layers, a more venturesome investment policy can be permitted in managing the assets in the fourth layer. In fact, because assets in the first three layers allow the company to earn a return on the underlying in force, a greater risk tolerance may be required for assets held in this free surplus layer if they are to earn an equivalent overall return.

The overall level of surplus identified as "free" to fund new ventures will vary by company. A low level of growth surplus need not indicate a lack of

vitality, but merely that returns on existing lines are attractive enough to merit a greater level of reinvestment.

As new ventures are formed or as new growth is funded, a reallocation of surplus by layer is required. The reallocation must be reflected in appropriate investment action. The distinction between layer three and layer four is the degree of commitment of the surplus investment to the existing lines. The more specific the business plan or the shorter the planning horizon, the more definite is the commitment of surplus funds. That surplus committed to layer three, should be reflected in appropriate investment action. This involves more than a paper transaction between layers. This is especially true where a more aggressive investment strategy is followed for the assets comprising free surplus.

Section 3: Implications for the Future

It should be obvious from this development that segmentation, although not explicitly required for the actuary's analysis, may in fact become a practical necessity. This stems from the detailed nature of the projected investment actions which accompany each scenario. Unless the future reinvestment strategies are kept very simple and assumed static for each scenario, the actuary will need assurance that a mechanism is in place to monitor ongoing investment activity. This is especially important if that analysis assumed that a projected cash flow matching strategy would be followed for several product lines. Where the assumption of individual investment strategies formed an integral part of certification, the maintenance of separate investment segments, each under the supervision of a portfolio manager, may be needed to insure credibility. The actuary may therefore find segmentation an indispensable tool in insuring the

increased degree of interaction between product and portfolio managers required in the future.

We also stress that surplus is held for a variety of purposes and can be held in a variety of forms. Not all surplus is needed to meet an immediate cash need, and it follows that not all surplus needs to be held in cash. Even surplus levels required to cover a potential economic (as opposed to statutory) loss need not be tied up in cash or short-term investments as long as the asset make-up was considered when setting that level. These revised investment goals take the first step toward insuring that investment policy is compatible with product guarantees, and it is natural to extend the same care shown in investing the basic policy funds to the investment of related contingency amounts.

The market value layer of surplus, for example, is tied closely to the economics of the underlying product and should be invested accordingly by a product's portfolio manager. This would naturally be in assets similar in quality to those assumed in product pricing and underlying the basic policy reserves. On the other hand, that same portfolio manager need not be made responsible for assets of less economic substance that are needed only in the solvency layer. These latter investments could be managed from a corporate account. This treatment would have the added advantage of not burdening any one line with the lower earnings on assets which cannot otherwise be disposed. The separate investment goals set for vitality or growth surplus require specialized investment techniques obtained only through the appointment of a separate portfolio manager.

The importance of the actuary's work in setting realistic levels of surplus should also be evident to any company managing on a return on equity basis. By projecting the surplus requirements forward into the future, a realistic measure of the surplus committed to the existing business plan can be determined. This measure has another advantage over existing formula amounts in that it makes allowance for conservative management style both in setting the absolute level required and in giving an indication of comparative risk. Management is then free to apply its own subjective views on these risks when setting a required return.

The method developed to help the actuary provide advice on surplus adequacy becomes a basic tool of risk management. It reveals not only how the amount and character of the surplus backing relate to product design and investment policy, but also provide greater detail on the nature of the risk underlying each endeavor. The major casualty in this new environment is, if not surplus "formulas" themselves, then at least management's comfort with them. There are no fixed rules to measure surplus adequacy -- there never were. The amounts needed are too dependent on the quality of the asset backing and the nature of the company's product mix to allow for a universal formula.

The emphasis is now on realism. The major tool is the analysis of the cash flow interactions that occur with the three major sources of risk — asset default, pricing inadequacy and interest rate fluctuation -- in a realistic investment setting. The touchstone in considering any changes to the basic methodology illustrated here should be, "Does it add to the realism of the scenario being tested?" It follows that management will want to study the effect of expected new business growth on the required layers of surplus and the effect of a single

year's sales on surplus requirements. Probable variations in unit expense levels and all tax consequences must be investigated. The cash flow expected from the existing asset and liability mix should be determined as closely as possible, with care given to the selection of probable future investment policy.