Article from:

Risks and Rewards
Newsletter

March 1998 – Issue No. 30

Portfolio Yield? Sure But …

by Thomas M. Grondin

W hat measure should be used for weighting? Traditionally, book values or market values have been used as weights. The problem is these measures provide only the yield earned on the portfolio at a moment in time. They do not take into account the distribution of the portfolio's assets. When using a portfolio-yield technique (average money technique) to determine crediting rates on new business for pricing or modeling, we implicitly assume all assets contribute the same amount of income dollars over the life of the liability.

If we introduced a new measure such as weighted average dollar duration (WADD) book yield, then we directly take into account the distribution of the assets in the portfolio. If the term implied by the duration of our asset portfolio resembles the term of the liability used, we are assured that using a WADD book-yield measure as our basis for determining the crediting rate will provide the income our spread dictates.

Example 1

Assume that our portfolio is made up of three assets: a $150 million (in terms of book value), 30-year strip yielding 7%; a $100-million seven-year Treasury yielding 6%; and a $250-million bond maturing in three days with a book yield of 12%. Further assume the durations of each asset are 30, 5, and 0, respectively. The book value weighted yield is 9.3%. Using a crediting spread of 130 basis points, the traditional method would result in a crediting rate of 8%. It is easy to see the duration of the assets is 10 years. Assuming the $1 million liability issued has the same duration as the portfolio, the present value of incoming payments on the liability would be $800,000. For simplicity, if we assume any excess asset cash flows are reinvested to maintain the portfolio's duration and dollar duration weighted-portfolio book yield, the actual income earned per $1 million of assets is $690,000. Thus, using a book-value weighted-portfolio yield as the basis of our crediting strategy has generated a loss of $110,000.

Using a WADD book yield as the portfolio yield crediting strategy, the WADD book yield equals:

$$\frac{(150 \times 30 \times 7\%)\ (100 \times 5 \times 6\%)\ (250 \times 0 \times 12\%)}{(150 \times 30)\ (100 \times 5)\ (250 \times 0)} = 6.9\%$$

Therefore, the crediting rate would have been 5.6% and the present value of income payments on the liability would have been $560,000 for a present value profit of $130,000. This result is intuitive since, given $1 million of business with a gross spread of 130 basis points, you must make $13,000 each year of the life of the liability on a gross basis.

This is a result that can close the gap between spread-management-oriented banking-type insurance executives and actuaries.

When trying to back out the effects on earnings of temporary positions taken by a portfolio manager against the target portfolio, the use of a straight book-value-weighted book yield advantage is misleading.

Example 2

This example is based on the performance methodology used in some companies. I am assuming a total rate of return basis with a target basket curve used for valuing the performance and releasing earnings to the income statement. Assume a new money-fund portfolio manager has a yield disadvantage over his target fund and assume the same assets as in the previous example. The manager believes spreads are going to widen. Further assume the target portfolio comprises the same types of assets as the actual portfolio, except the target's 30-year strip is a lower quality earning 9%. Using a weighted-book-yield approach, the actual portfolio is deficient in yield by 60 basis points. This would translate to an estimated present value impact on earnings of $30 million (0.006 × 10 years × $500 million). The WADD book yield of the target portfolio is 8.7%. This compares to the actual portfolio WADD book yield of 6.9%, which translates into a present value hit to earnings of $90 million [(0.087 − 0.069) × $500 million durations]. Because this concocted example is simple, we know exactly what the temporary position is and can therefore confirm our results. In practice, we generally do not have specific knowledge of the temporary position except perhaps the sector and from which part of the curve the position was taken. Continuing, we know the position is on the 30-year strip with a duration of 30 and a yield shortfall of 200 basis points on the full $150 million invested. This easily translates to a present-value impact of $90 million. Note, for this example, that we have ignored the projection of defaults because it would only have complicated the matter and given further support to the WADD approach.

Some uses of WADD book yields:

- To determine crediting rates for average money portfolios. The technique displayed can be further refined to handle liabilities of various terms that are credited from the same average money portfolio. One would only need to look at the assets and the weighted-average-dollar key rate duration yields for the term desired.

- To determine the true yield earned over the life of a heterogeneous pool of mortgages created for pass-through.

- To determine the present-value impact of a yield advantage/disadvantage a portfolio manager has over the target portfolio because of a temporary position taken in lower/higher quality issues.

- Along with the WADD crediting yield on a block of liabilities, to determine the present value of future income at any time.

- The spread between the asset WADD yield and liability WADD yield can be used as a management statistic on existing and new business.

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