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Variable Annuity DAC: A Survey of Current Practice

by Laura J. Hay and Elizabeth Rogalin

A "hot topic" in the variable annuities area is the effect of negative equity market returns on the DAC unlocking process and loss recognition testing. Numerous equity analysts sounded an alarm in July, with doomsday predictions of anticipated DAC writedowns for large VA writers. Certain companies have been singled out as especially vulnerable to writedowns, based on their DAC methods, mix or age of business or lapse experience. Most of the analysts cite recoverability of the DAC balance as a driver; while others dwell on "unrealistic" assumed returns, either in terms of growth rates or time horizons. In September, as part of a comprehensive review of the industry sparked by recent adverse performance in the investment markets, Fitch lowered their financial strength ratings on more than 35 life insurance groups. As reported in the press, key reasons for the reevaluation include the decline in insurers' investment portfolios and the plummeting value and popularity of variable products (both annuities and life insurance). In this environment, it seems appropriate to survey current practice among life insurers writing variable annuities, and to view the effect on reported DAC of common techniques. Note that the authors cannot comment on the appropriateness of a specific technique below for an individual company; such an assessment must be based on the company's particular facts and circumstances.

BACKGROUND

Let's start with a quick review of DAC unlocking in a FAS 97 environment. Deferred acquisition expenses (DAE) are capitalized, and are amortized in proportion to the present value of estimated gross profits (EGPs). The amortization rate (or "k

continued on page 4

What's Inside

factor") used is determined at inception as the present value of DAE divided by the present value of EGPs. Future EGPs are projected using best estimate assumptions. At subsequent valuation dates, the DAC balance is "trued up" to reflect actual EGPs for the current and historical periods, and current in force. In addition, future EGPs may be re-projected using revised best estimate assumptions. A new k-factor is calculated, and the resulting difference in the DAC balance (reflecting both of these processes) is the "unlocking adjustment" or "DAC catch-up." The DAC balance at each period can be expressed as follows:

	DAC at beginning of period
+	Interest accrued on DAC
+	New capitalized DAE
–	DAC amortization
+/–	DAC unlocking
=	DAC at end of period

Although a number of companies are evaluating stochastic techniques, many have not yet adopted them for general use.

Variable Annuities

All of the above applies to any FAS 97 business, but variable annuities have unique characteristics. First, assets backing variable annuities are primarily invested in separate accounts with large equity exposure. Second, EGPs for variable annuities generally consist of M&E charges, less expenses. M&E charges are typically defined as a percentage of fund value. Therefore, the actual level of current account values, and the projected future levels (if used to project future M&E charges), impact the EGPs. In a down market environment (as today), variable annuity business experiences a double hit: lower account values today, and potentially lower account values in future periods. If the EGPs are modeled as a fixed percentage of the account value, then EGPs will be lower in both current and future periods. A lower total present value of EGPs will result in a higher k-factor, leading to a larger (negative) DAC catch-up. The result is counter-intuitive: higher DAC amortization occurs in periods when EGPs are lower.

The scenario above assumes that a lower current account value leads automatically to lower future account values. That is, it assumes that the future market growth rate will be the same as previously assumed. But actuaries have devised various techniques to derive revised assumptions about the future market growth rate and to calculate the resulting DAC. These techniques have sometimes been portrayed as an attempt to mitigate the volatility of the DAC amortization, but they may also be seen as capturing a "best estimate" of the future, in which variations in market returns are assumed to reverse.

Current Practices

So what methods are companies actually using to calculate VA DAC? While all of the methods employed seem to fit the general FAS 97 framework described above, the techniques vary widely, and may be used in combination as well. Generally speaking, however, some broad categories can be identified.

Stochastic

First, techniques can be classified as either stochastic or deterministic. Stochastic techniques involve projecting many series of future returns, randomly generated, each of which is then used to calculate EGPs and DAC. The DAC may be selected as a fixed percentile of the resulting DACs, or as a value within a predetermined "corridor." For a detailed description of stochastic techniques, and the selection of an appropriate DAC value, refer to "Stochastic DAC Unlocking for Variable Annuity Products" in the March 2001 edition of *The Financial Reporter*.

Traditional

Although a number of companies are evaluating stochastic techniques, many have not yet adopted them for general use. Instead, they apply deterministic techniques, which use a single set of assumed future returns. The base technique in this group can be called "traditional" or "point-to-point." This technique uses current account values as a starting point. Future fund values (and related EGPs) are calculated using a best estimate assumption of future return, which would usually be a single level rate (for example, 8 percent in all future years). The traditional method

is the same as that used for general account products.

Mean Reversion

Other deterministic techniques can be identified as "mean reversion." This term actually refers to an approach to setting assumptions, in which the future investment return is expected to "return to the mean" over some period. Therefore, future assumed returns are modified based on a formula specified by the company. The formula may use a cumulative average from a specified "anchor year." The company could specify the circumstances under which the anchor year will be reset, for example if the calculated DAC falls outside of a range. Alternately, the company may use a "look-back," "look-forward" or both of x years (for example, the last three or five years, or the next three, five or 20 years). The formula may also incorporate a floor (e.g. 0 percent)) or a cap (e.g. 15 percent), and specify additional adjustments to the formula, accordingly. If the company chooses to use a look-back or look-forward formula, then projected future returns may vary for different issue years; in order to avoid the apparent inconsistency, the company may use a weighted average of the various projections to obtain a single calendar year assumption. Given that the term "mean reversion" is commonly applied to all such variations, it is important in any discussion to determine the specific technique or formula being applied.

Corridor

A corridor technique may be used on a standalone basis or in combination with the methods above, in calculating the unlocked DAC balance. A corridor is defined around one DAC value. The corridor may be stated as a percentage of the DAC balance, a fixed dollar amount or some other parameter. Another DAC value is used as a "marker." New DAC balances are calculated at each valuation date, and then compared. If the "marker" DAC balance (however specified) is within the corridor, the company will use that value as the reported DAC. If the "marker" DAC balance is outside the corridor, a different value will be used as the reported DAC. Depending on the combination of specific techniques being applied, the company may at this point adjust its

mean reversion formula, update the anchor year or revert to a point-to-point DAC balance. An example of the corridor approach is illustrated below. The underpinning for the corridor approach is a stochastic mindset, which contemplates a range of reasonable possibilities.

Long Term EGP

Finally, other companies use techniques that can be loosely grouped and identified as "long term EGP" or "credibility" methods. These techniques project future EGPs at issue. Then, at succeeding valuation dates, historical EGPs are "trued up." Projected future EGPs are evaluated, but typically they are left unchanged under the assumption that these still remain the company's best estimate of future EGPs. That is, the EGPs are viewed as an absolute amount, rather than an assumed return applied to the current account value. Alternately, the company could choose to weight or blend these "absolute EGPs" with an updated projection of EGPs based on the assumed future return applied to the current account value.

A potential criticism leveled at the Long Term EGP method can be the apparent disconnect between the current and projected account values. Under this method, the future EGPs are viewed as the assumed return applied to the originally assumed account values, rather than to the actual current account value. However, as the projected future EGPs are "fixed" in absolute terms, this is essentially equivalent to using the actual current (lower) account value and assuming a higher future

continued on page 6

Table 1

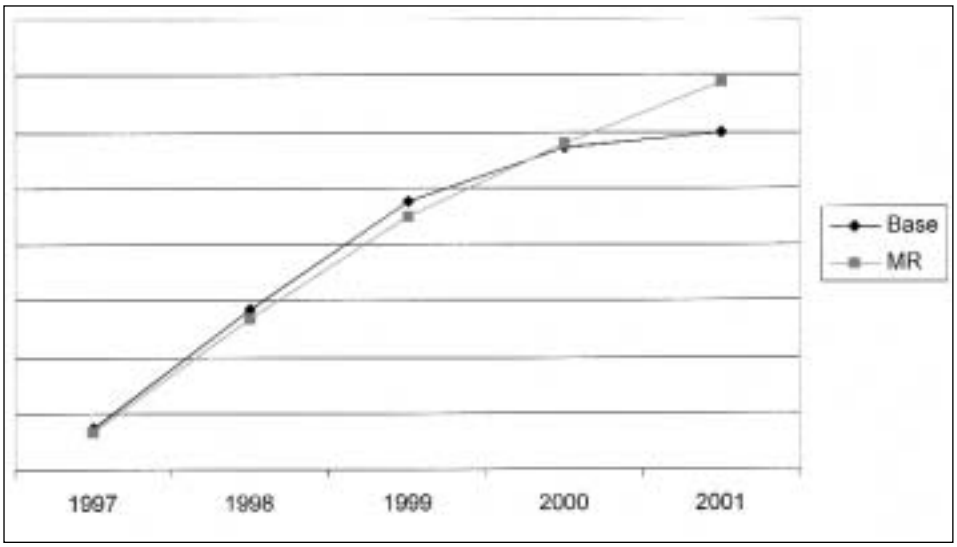
	Actual Return	Projected Returns Using Mean Reversion 1997	1998	1999	2000	2001
1995	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
1996	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
1997	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
1998	8.00%	**4.75%**	8.00%	8.00%	8.00%	8.00%
1999	10.00%	**4.75%**	**4.42%**	10.00%	10.00%	10.00%
2000	-6.00%	**4.75%**	**4.42%**	**3.45%**	-6.00%	-6.00%
2001	-12.00%	7.00%	**4.42%**	**3.45%**	**8.01%**	-12.00%
2002		7.00%	7.00%	**3.45%**	**8.01%**	**15.00%**
2003		7.00%	7.00%	7.00%	**8.01%**	**15.00%**
2004		7.00%	7.00%	7.00%	7.00%	**15.00%**
2005		7.00%	7.00%	7.00%	7.00%	7.00%
>2005		7.00%	7.00%	7.00%	7.00%	7.00%

Table 2

	Base (no MR)	Unlocked w/MR	Difference	% Diff
1997	77,335	76,498	836	1%
1998	98,332	96,884	1,448	1%
1999	117,659	114,979	2,680	2%
2000	127,044	128,003	(959)	-1%
2001	129,977	138,721	(8,744)	-7%

Comparison of DAC with and without Mean Reversion

Graph 1



return (to arrive at the same absolute amount of EGP). In this sense, the technique can be considered equivalent to the mean reversion techniques above; the implicit future return based on the current account value could be calculated, and could be significantly higher than recent past returns.

Numerical Example

Assume a block of VA business, with a $1 million deposit in each of years 1995-2001, and the following characteristics:

- M&E charge of 1.5 percent of the account value
- Deferrable commission of 3 percent
- Expenses of 1 percent of the account value
- Static DAC discount rate of 7 percent
- Withdrawals (as annual percent of account value) of 5, 7, 9, 11, 13, 15, 16, 17, 18, 19 and 20 percent thereafter

The tables on page six and seven compare the base technique to a mean reversion technique, and then consider the effect of a corridor on the reported DAC balance. The base technique is traditional, or point-to-point, and assumes a 7 percent net return (market growth rate less M&E). The mean reversion formula uses 1995 as the anchor year, with a three year forward reversion period, and a cap of 15 percent and floor of 0 percent. The formula also assumes a long term net return of 7 percent.

Using these parameters, the actual and projected returns are as shown in Table 1 on page six. The years shown in the left column indicate the calendar year, while the years shown across the top row indicate the valuation year. For example, in the column titled "1998," actual calendar year returns are used from the anchor year (1995) through 1998. The mean reversion formula is used to calculate the expected return for the following three years (of 4.42 percent), after which the expected return reverts to the long term assumption of 7.00%. (Note that in 2001, the calculated mean reversion return is capped at 15%.) These returns are then used to calculate DAC balances, using the base and mean reversion techniques, as shown in Table 2 and in Graph 1.

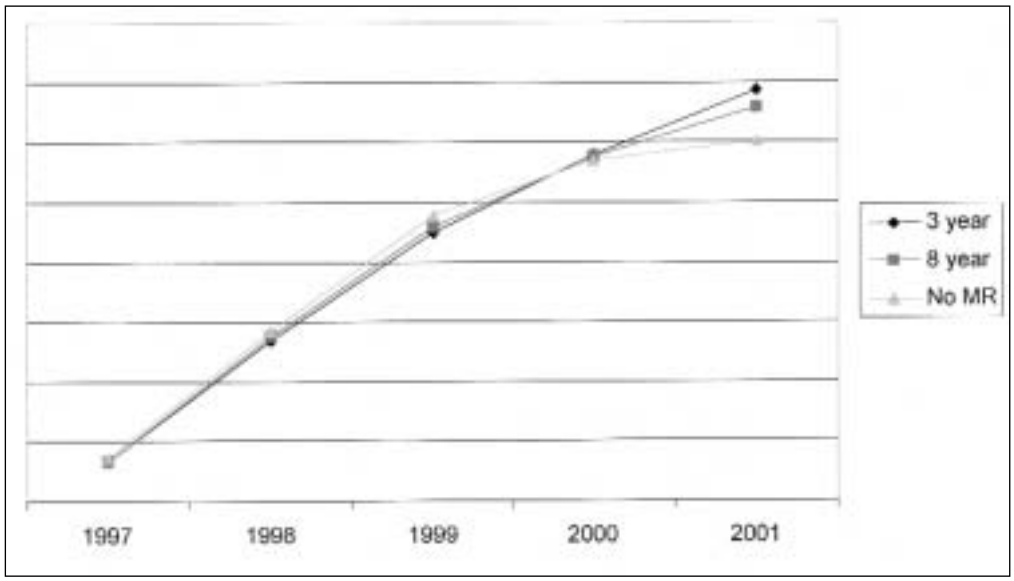
Table 3

	Actual	Projected Returns Using Mean Reversion				
	Return	1997	1998	1999	2000	2001
1995	12.00%	12.00%	12.00%	12.00	12.00%	12.00%
1996	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
1997	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
1998	8.00	6.14%	8.00%	8.00%	8.00%	8.00%
1999	10.00%	6.14%	6.02%	10.00%	10.00%	10.00%
2000	-6.00%	6.14%	6.02%	5.66%	-6.00%	-6.00%
2001	-12.00%	6.14%	6.02%	5.66%	7.38%	-12.00%
2002		6.14%	6.02%	5.66%	7.38%	10.04%
2003		6.14%	6.02%	5.66%	7.38%	10.04%
2004		6.14%	6.02%	5.66%	7.38%	10.04%
2005		6.14%	6.02%	5.66%	7.38%	10.04%
2006		7.00%	6.02%	5.66%	7.38%	10.04%
2007		7.00%	7.00%	5.66%	7.38%	10.04%
2008		7.00%	7.00%	7.00%	7.38%	10.04
2009		7.00%	7.00%	7.00%	7.00%	10.04%
2010		7.00%	7.00%	7.00%	7.00%	7.00%
>2010		7.00%	7.00%	7.00%	7.00%	7.00%

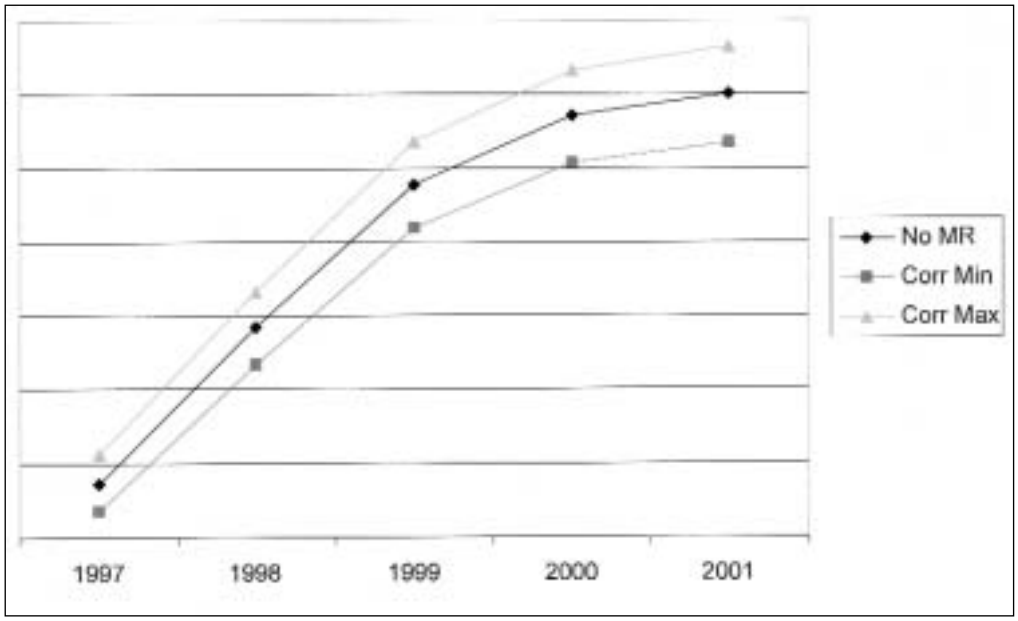
Actual and Assumed Growth Rates using Eight year Forward Reversion

continued on page 8

Graph 2 - Comparison of DAC with Three Year and Eight Year Forward Reversion



Graph 3



Comparison of DAC with and without Mean Reversion

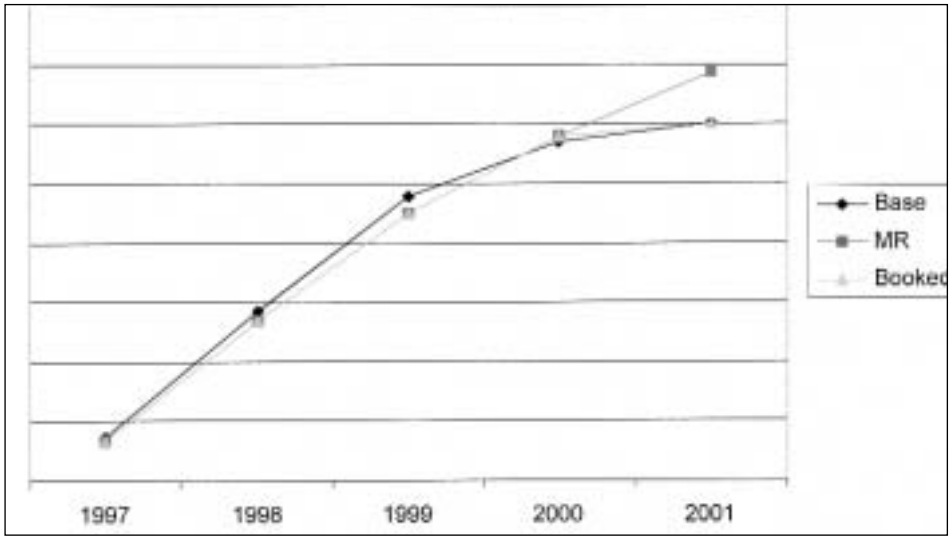
An alternate mean reversion technique can be applied, using an eight year forward reversion period. This produces the expected returns shown in Table 3 on page seven.. A comparison of the mean reversion DAC balance using the three year and eight year forward periods is shown in Graph 2 on page eight. Note that the eight year forward reversion period always results in a DAC closer to that calculated without mean reversion (as the projected earned rates are closer to the long term assumption of 7 percent).

Table 4

	Base (No MR)	Unlocked W/MR	Corridor Min	Max	Booked	Booked less Unlocked w/No MR	% Diff
1997	77,335	76,498	73,468	81,201	76,498	(836)	-1%
1998	98,332	96,884	93,415	103,249	96,884	(1,448)	-1%
1999	117,659	114,979	111,776	123,542	114,979	(2,680)	-2%
2000	127,044	128,003	120,692	133,396	128,003	959	1%
2001	129,977	138,721	123,478	136,476	129,977	_	0%

Corridor Calculations

Graph 4



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A corridor technique may also be combined with the mean reversion technique. Returning to the original example using a three year forward reversion period, the corridor has been defined as the base DAC (without mean reversion), plus or minus 5 percent, as shown in Graph 3. At the valuation date, if the mean reversion DAC lies within this corridor, then the mean reversion DAC is booked. If the mean reversion DAC lies outside the corridor, then the company books the base DAC (i.e. traditional, without mean reversion), and the current date becomes the new anchor date. (Note that other approaches are also possible.) The resulting DAC balances are shown in Table 4 and in Graph 4 on page nine.

Effect of the Current Environment

Although the theoretical basis supporting mean reversion continues to evolve, the general approach has been widely accepted in the actuarial community. However, the negative returns experienced recently, combined with a mean reversion formula, sometimes create questionably high projected returns, in some cases approaching or exceeding a previously specified cap. The use of questionably high values raises questions about the appropriateness of the underlying model. It has also captured the attention of analysts, who state that companies may need to reevaluate assumptions, and possibly incur DAC writedowns, in the near future.

Therefore, companies are evaluating their projected returns, and even their continued use of the mean reversion method. Under FAS 97, the EGPs used to calculate the DAC balance are defined as "best estimate." This implies that regardless of how the component assumptions are derived (whether a level assumption or a mean reversion calculation, for example, in the case of market returns), the EGPs thus calculated should represent management's best estimate of those future gross profits. This may require additional work (including appropriate documentation) in the current environment. New requirements that management certify their financial statements can only increase the scrutiny of a company's EGP projection. Companies should also evaluate loss recognition testing closely, and consider sensitivity or stress testing, to obtain a better understanding of where the limits may fall. That is, management may find it very useful to understand what will cause the current model to "fail" (whether that failure is defined as loss recognition, increased DAC amortization beyond a certain amount or other criterion). Companies must also consider whether any changes constitute a change in methodology for GAAP reporting purposes.

A side debate can arise over the merits and drawbacks of a mechanical (formula) approach. The use of a formula such as mean reversion can be seen as limiting the application of the actuary's (and management's) judgment (normally implicit in the term "best estimate"). However, it can also be viewed as evidence that management is not "manipulating earnings." Various definitions of earnings management exist, but it could generally refer to an action affecting (generally improving) earnings, which is not justified by events or conditions occurring at the time. In this context, a mean reversion formula (for example) could be considered to use current market conditions as a basis for a change in assumptions (and related financial statement balances).

In general, as in other areas of GAAP, the selection (or updating) of assumptions and future EGPs requires a "balancing act," in that a company's best estimate must take appropriate recognition of both current conditions and an ultimate, or long term view. Earnings recognition should be neither accelerated nor delayed.

Conclusions

In the current environment, increased attention is focused on variable annuity DAC unlocking. While the effects will vary, depending on each company's investment approach and experience, techniques employed, and assumptions derived, certain "hot buttons" can be identified. Actuaries should carefully evaluate their projected EGPs against the FAS 97 requirement of "best estimate." They should be fully prepared to defend (and document) the techniques and assumptions used. Finally, actuaries should invest more effort in evaluating loss recognition testing and alternate scenarios, to better understand the inherent sensitivities in their selected DAC techniques.

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