STABLE VALUE CREDITING RATES

How They Work, How They are Calculated

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CREDITING RATES are a key component of stable value investing. We address how a stable value crediting rate works and the role that the crediting rate plays in determining the overall blended yield of a stable value fund. Our focus is on the crediting rate for synthetic GICs (also known as security backed investment contracts), although much of what we cover also applies to participating separate account GICs as well. The discussion is less relevant to traditional GICs and non-participating separate account GICs, since these are typically fixed or floating rate fixed maturity contracts and are not addressed.

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THE STABLE VALUE CREDITING RATE

INTRODUCTION

Stable value funds are typically considered to be a "safe" investment option in many defined contribution plans. They are designed to preserve principal and generate steady rates of return, while allowing participants to make withdrawals at contract value (principal plus accrued income), regardless of market conditions.

Over the long run, stable value funds have delivered returns that are similar to the returns of intermediate-term bonds; yet the volatility of those returns has been equal to or less than that of money market funds. This favorable risk/return profile is one of the main reasons that stable value is such a popular choice among plan participants.

A crediting rate is the interest rate earned on the contract value (principal plus accrued income) expressed as an effective annual yield.

Stable value funds typically have durations of about three years, which helps explain their bond-like returns. But how do they maintain such low volatility? The answer lies with the mechanics of contract value accounting provided through contracts issued by high quality financial institutions. Stable value funds are able to report smooth returns because investment contracts are benefit responsive and insulate participants from movements in bond prices and changes in market interest rates. This smoothing effect is achieved through the crediting rate. Financial institutions that issue investment contracts calculate the initial crediting rate and then reset it periodically, typically on a quarterly basis.

WHAT IS A CREDITING RATE?

A crediting rate is the interest rate earned on the contract value (principal plus accrued income) expressed as an effective annual yield. The crediting rate also acts as a stabilizing mechanism by amortizing investment gains and losses so that participants are protected from short-term changes in market value. Principal preservation is furnished by a contractual minimum crediting rate of 0% and contractual provisions that require the contract issuer to make payments at contract value in the event that the supporting fixed income investments are depleted.

HOW IS A CREDITING RATE CALCULATED?

It is the underlying bond portfolio's performance that ultimately determines the crediting rate of a participating separate account GIC and a security backed investment contract. Thus, the crediting rate formula is a function of the **contract value** of the investment contract, the **market value** of the underlying bond portfolio, and the **yield** and **duration** of the underlying bond portfolio. The crediting rate is designed to converge the difference in the investment contract's value and the market value of its underlying collateral by amortizing those differences over time. This convergence is represented as a market value to contract value ratio (MV/CV). It is set at a rate that is equivalent to the portfolio yield,

adjusted for the difference between market value and contract value (positive or negative) over the amortization period less the fees that financial institutions charge for the contract. In the current environment, fees typically range from 0.15% to 0.25% of the investment contract's value. The amortization period is typically defined by the duration of the bond portfolio.

Compounding Crediting Rate Formula:

The most commonly used crediting rate formula in the stable value industry is as follows:

Gross crediting rate = (MV/CV)^(1/D)*(1+AYTM)-1; where

MV = market value

CV = contract value

D = duration

AYTM = annualized yield to maturity = $(1+\frac{YTM}{2})^2-1$

How the Crediting Rate Formula is Derived:

The contract value (CV) when compounded at the crediting rate (CR) for the duration of the portfolio (D) equals the market value of the portfolio (MV) when compounded at the portfolio's annualized yield to maturity (AYTM) for the same duration of the portfolio (D). This assumes there are no changes in market rates or portfolio yield.

CV*(1+CR)^D = MV*(1+AYTM)^D

[CV*(1+CR)^D]^(1/D) = [MV*(1+AYTM)^D]^(1/D)

CV^(1/D)*(1+CR) = MV^(1/D)*(1+AYTM)

1+CR = (MV/CV)^(1/D)*(1+AYTM)

CR = (MV/CV)^(1/D)*(1+AYTM)-1

In short, the contract value must accrue the crediting rate for "D" years to converge to market value, assuming the market value portfolio continues to earn the annualized yield to maturity for the same period.

Successfully managing the crediting rate component variables is key to assuring that a stable value fund makes good on its name by providing a consistent rate of return.

THE IMPACT OF COMPONENT VARIABLES

The crediting rate formula is somewhat complex and, as noted earlier, is primarily affected by these component variables: the market value to contract value ratio, the yield of the underlying bond portfolio, and the duration of the underlying bond portfolio. While it is not necessary to master the crediting rate formula, it is important to understand how each of these variables impact the crediting rate.

Market Value to Contract Value Ratio

The relationship between the contract value and the market value of the underlying bond portfolio determines whether the crediting rate will be more or less than the yield of the bond portfolio. Relative to the bond portfolio's yield, a market value "deficit" (MV<CV) decreases the yield credited to participants, and a market value "surplus" (MV>CV) increases the yield (see *Figure 1*). If market value and contract value are equal, the net crediting rate will be set equal to the yield of the underlying bond portfolio, less the contract fee.

Keeping all other variables constant, an increase in the MV/CV ratio will improve the crediting rate, while a decrease in the ratio will result in a lower crediting rate. This holds true whether market value is greater than or less than contract value.

Annualized Yield to Maturity

The yield of the underlying bond portfolio is the portfolio's expected rate of return at a point in time, assuming bonds are held to maturity and cash flows are reinvested at the same rate. This is the expected earnings potential of the assets wrapped by the security backed investment contract.

Holding all other variables constant, an increase in the yield of the underlying portfolio will increase the crediting rate. Conversely, a lower yield will decrease the crediting rate.

Duration

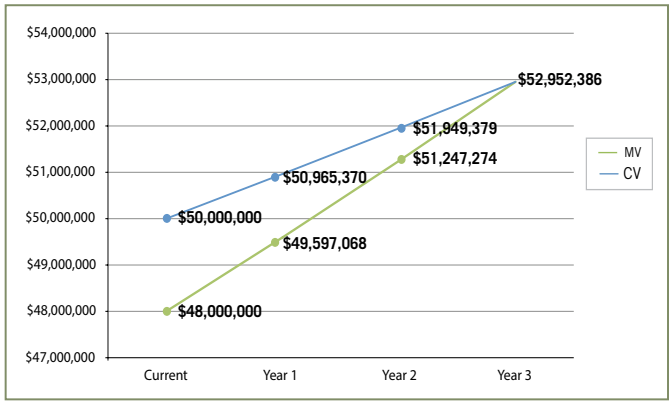
Duration is a measure of interest rate risk, but in the crediting rate formula, the duration variable determines how quickly the difference between market value and contract value will be amortized. The shorter the duration of the underlying bond portfolio, the more quickly the difference will be amortized. As previously mentioned, stable value funds typically have durations of approximately three years.

FIGURE 1 | THE IMPACT OF THE MARKET VALUE TO CONTRACT VALUE RATIO ON THE CREDITING RATE

If Market Value is LESS than Contract Value...

Market Value	$48,000,000
Contract Value	$50,000,000
MV/CV Ratio	96.0%
Duration	3.00 Yrs
Yield to Maturity	3.30%
Annualized Yield to Maturity	3.33%
Gross Crediting Rate	1.93%

...the contract value crediting rate will be less than the bond portfolio's yield, to allow the market value "deficit" to be made up over time.



Contract Value Growth

$50M(1+1.93%)^3 =$52,952,386*

Market Value Growth

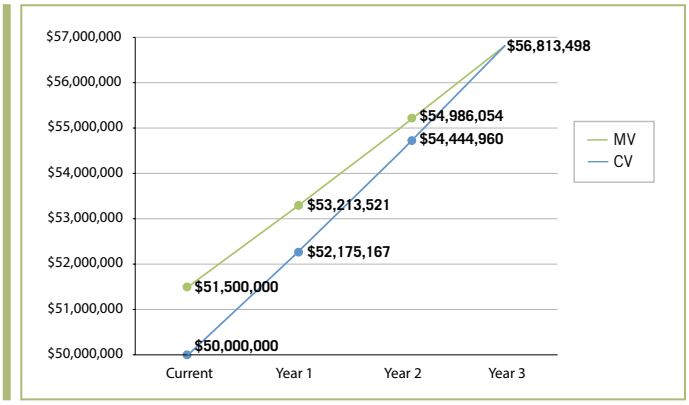
$48M(1+3.33%)^3 =$52,952,386*

$0

If Market Value is GREATER than Contract Value...

Market Value	$51,500,000
Contract Value	$50,000,000
MV/CV Ratio	103.0%
Duration	3.00 Yrs
Yield to Maturity	3.30%
Annualized Yield to Maturity	3.33%
Gross Crediting Rate	4.35%

...the contract value crediting rate will be greater than the bond portfolio's yield, to allow the market value "surplus" to be recognized in the contract value over time.



Contract Value Growth

$50M(1+4.35%)^3 =$56,813,498*

Market Value Growth

$51.5M(1+3.33%)^3 =$56,813,498*

$0

As shown in the above example, the crediting rate converges the differences in the investment contract's value and the market value of its underlying collateral by amortizing those differences over the duration of the portfolio.

*using extended decimal places for AYTM and crediting rate

Since duration sets the amortization period, its impact is slightly more complicated than that of the other component variables. When market value is less than contract value, a loss is being amortized, and a longer duration amortizes the loss over a longer period of time (assuming all other variables are held constant). An increase in duration therefore results in a higher crediting rate. When market value exceeds contract value and a gain is being amortized, a longer duration amortizes the gain over a longer period, decreasing the crediting rate. The opposite is true when duration is shortened, as shown in *Figure 2*.

FIGURE 2 | IMPACT OF DURATION ON THE CREDITING RATE

Change in Portfolio Duration	Impact on Crediting Rate	
	MV < CV	MV > CV
Longer Duration	**Increases** the Crediting Rate	**Decreases** the Crediting Rate
Shorter Duration	**Decreases** the Crediting Rate	**Increases** the Crediting Rate

Some contract issuers now require a shorter amortization period as a consequence of the financial crisis and deterioration in the market values of some underlying bond portfolios.

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Certain contract issuers require crediting rates to be reset based on a percentage of portfolio duration (from 50%-99%) if the MV/CV ratio falls below a certain threshold. By shortening the amortization period for the loss, these contract issuers are requiring an adjustment to the crediting rate to more quickly narrow the gap between market value and contract value.

A Word About Management

Examining these "all else equal" scenarios in *Figure 1* helps illustrate the impact of changes in each of the crediting rate formulas' component variables. Yet in reality, stable value funds face a dynamic and constantly shifting market environment. Because each variable can have a dramatic effect on the crediting rate, it is important for a stable value manager to actively seek to limit the volatility of these factors in the underlying bond portfolio. Successfully managing the crediting rate inputs is key to assuring that a stable value fund makes good on its name by providing a consistent rate of return.

THE IMPACT OF CASH FLOWS

Cash flows can also materially impact the crediting rate. Cash deposits to an investment contract whose market value is less than its contract value improve the MV/CV ratio.

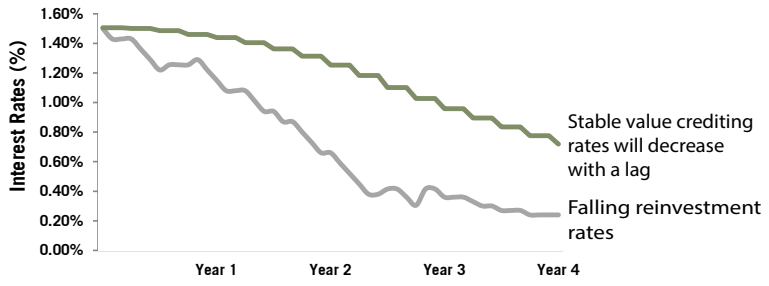
Withdrawals that must be made from an investment contract whose MV/CV ratio is below 100% lowers the ratio. The opposite of each is true when a contract's market value exceeds its contract value (see *Figure 4*).

The interest rate environment in which cash flows occur can also affect the crediting rate (see *Figure 3*). If current reinvestment rates are lower than the current portfolio yield, substantial cash inflows will negatively impact the yield, and thus the crediting rate. However, if reinvestment rates are higher than the portfolio yield cash inflows will improve the yield and crediting rate more quickly than if the portfolio relied upon the reinvestment of its internal cash flows alone.

FIGURE 3

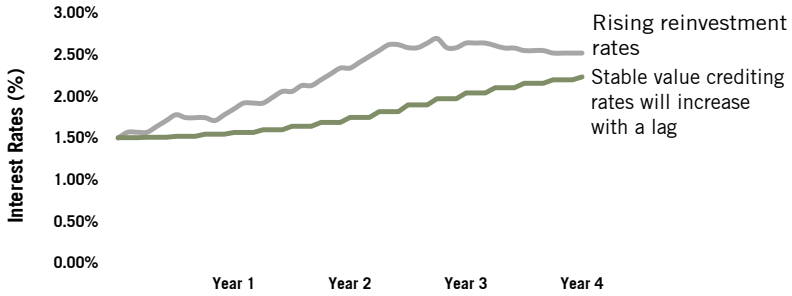
The Crediting Rate in a Falling Interest Rate Environment

If reinvestment rates are lower when cash flows are reinvested, the crediting rate will decrease (with a lag)...



The Crediting Rate in a Rising Interest Rate Environment

If reinvestment rates are higher when cash flows are reinvested, the crediting rate will increase (with a lag)...



Persistently low interest rates have resulted in lower fixed income yields within underlying bond portfolios, putting downward pressure on stable value crediting rates.

FIGURE 4 | IMPACT OF CASHFLOWS ON THE CREDITING RATE

Cashflow	Market to Contract Value Ratio	Immediate Typical Impact on Crediting Rate
Positive	MV/CV > 100	Negative
Positive	MV/CV < 100	Positive
Negative	MV/CV > 100	Positive
Negative	MV/CV < 100	Negative

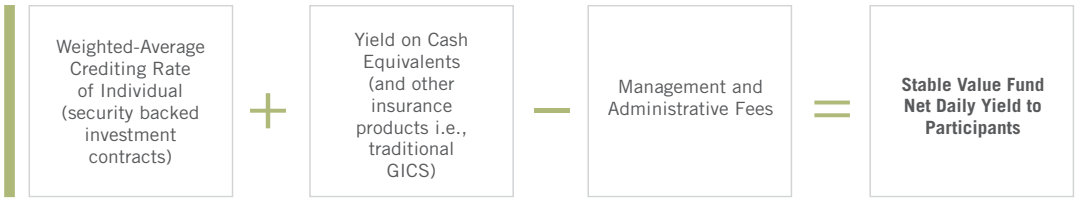
A stable value manager can usually control the duration impact of any significant cash flows. Therefore, cash flows typically affect the crediting rate through the MV/CV ratio and the portfolio yield as described earlier.

FROM THE CREDITING RATE TO THE PARTICIPANT'S DAILY YIELD

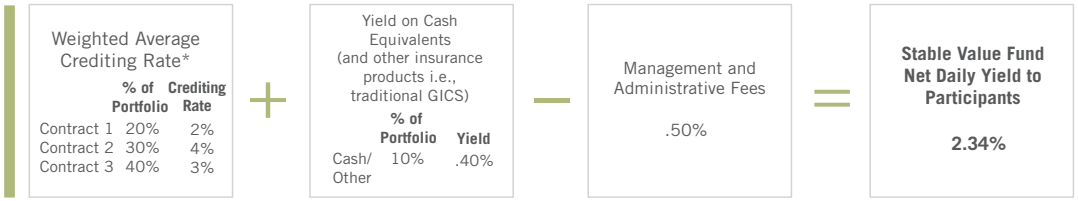
In stable value funds that invest primarily in security backed investment contracts, the overall blended yield of a stable value fund—the daily yield earned by participants—is primarily determined by the crediting rate mechanism. Participants in a stable value fund earn the average credited rates of interest on all of the stable value contracts held in the fund. The daily yield is a weighted average based on the investment value of the individual investments; it also reflects the interest earned on cash held for liquidity purposes as well as the crediting rates of any other insurance products owned in the fund, such as traditional GICs. Management and administrative fees reduce the yield (see *Figure 5*). Like the crediting rate of a security backed investment contract, the yield on a stable value fund generally follows the direction of interest rates with a lag.

FIGURE 5

The Components of Daily Yield



Calculating the Daily Yield



* Assumes use of three security backed investment contracts

The Math Behind the Daily Yield Calculation

20% x 2% + 30% x 4% + 40% x 3% + 10% x .40% = 2.84% **Portfolio Gross– Yield**

0.50% **Less Fees**

= 2.34% **Stable Value Fund Net Daily Yield to Participants**

Example: Applying the Daily Yield to a Participant's Account

Participant balance beginning of day 1 = $10,000.00

Participant balance end of day 1 = $10,000 x $(1+2.34\%)^{(1/365)}$ = $10,000.63

Assuming no change in crediting rate for 1 year,

Balance at the end of year 1 = $10,234.00

THE CREDITING RATE MECHANISM: A KEY COMPONENT FOR MAINTAINING STABLE YIELDS

Investment contracts and the use of a crediting rate are critical components for maintaining consistent, competitive yields in a stable value investment option. These contracts enable an investment manager to invest in a portfolio of short-to-intermediate term fixed income securities, while insulating plan participants from volatility in the value of their investment. This ability to dampen volatility is a distinct feature of the stable value asset class, and allows stable value funds to provide plan participants protection against loss of principal and attractive risk-adjusted returns that have historically outpaced inflation.

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