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Investment viewpoint

Swiss credit: a broad method to approximate bond returns

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Following our last white paper that argued the price of a bond alone says little about its expected return potential, this paper attempts to approximate the expected return of a bond as well as a bond portfolio using a practitioner's method.

Need to know

- Using yield to maturity to estimate expected bond returns fails to take into account variations in the periods up until the maturity date and mixes different time horizons
- We present a practitioner's method to approximate bond returns that takes into account duration, duration times spread, the length of the return period and the level of systematic risk factors
- The method can also be applied to bond portfolios using different possibilities and degrees of differentiation. We show expected return simulations over one- and five-years

Why the periods before maturity matter

In practice, the expected return of a bond is often estimated using the yield to maturity. As the name suggests, however, the yield to maturity always refers to the period up to the maturity date, which can vary considerably. The yield to maturity of a bond that today still has 10 years to maturity usually poorly indicates the return expected from the bond in the next year. The best example of this was in 2022, a difficult investment year during which some bonds had a positive yield to maturity at the beginning of the year but ended up with a clearly negative return over the whole year.

Using yield to maturity to estimate and compare expected bond returns is of limited use because focusing on the maturity date leads to the mixing of different time horizons and the relevant market fluctuations for common return periods are not taken into account.

A practical method to estimate bond returns

Instead, we advocate using a practical method to estimate bond returns. A very important prerequisite for the meaningful comparison of returns of any asset class is that the comparison is based on the same return period, with the same start and end dates.

Subsequently, one should consider which factors have the strongest influence on the returns of the asset class in question. In the case of investment-grade bonds, the return is usually determined mainly by so-called systematic factors and less by security-specific characteristics. As a rule, the return of an investment-grade bond can be approximated relatively accurately based solely on the change in interest rates and credit spreads.

The practitioner's method for approximating bond returns is based on two steps. In the first step, the length of the return period is not taken into account. This approximation only calculates return based on an instantaneous shift in interest rates and credit spreads, using the following formula:

$$R_1 = -Duration \cdot \Delta_{abs} Rates - DTS \cdot \Delta_{rel} Spreads$$

Only the duration and the 'duration times spread' (DTS) of the bond are needed for the calculation. The duration is the interest-rate sensitivity of the bond, or how strongly the price of the bond reacts to an absolute change in the risk-free interest rate curve. DTS is a common measure of the credit sensitivity of the bond, or how the price of the bond reacts to a percentage change in the credit risk premium.

Here's a simple example: suppose we have a bond with a duration of five years and a DTS of 5%. We also expect interest rates to decline by 0.3% over the next year and credit spreads to increase by 20%. According to the above approximation formula, this results in an expected return contribution of:

$$R_1 = -5 \cdot (-0.30\%) - 5\% \cdot 20\% = 0.5\%$$

This return contribution is independent of the current level of interest rates and spreads, or of the length of the return period under consideration (in this case one year). The length of the return period and the level of the systematic risk factors are only taken into account in the second step by approximating the current income over the return period.

$$R_2 = Income_{Rates} + Income_{Credits}$$

For the sake of simplicity, we assume in the above example that we have a flat yield curve at the level of 1% today and that the credit risk premium is also 1% regardless of maturity. According to the scenarios mentioned at the beginning, the interest rate level at the end of the year is 0.7% and the credit risk premium is 1.2%. The average current interest income is therefore 0.85% and the average current credit income 1.10%. Together, this results in the following for the second return component:

$$R_2 = 0.85\% + 1.10\% = 1.95\%$$

In total, this simple example results in an expected return over the next year of

$$R = R_1 + R_2 = 0.5\% + 1.95\% = 2.45\%$$

Although this practitioner method is relatively easy to apply, it is important to have a good understanding of the individual components and to assess the impact of deviations on the basic assumptions.

In theory, the first return component is often referred to as the "linearisation of returns". As long as the interest rate and spread changes are not too large and the duration is not too long, this formula provides a very good approximation of the first return component.[1]

For the second return component, it is important to emphasise that its importance increases with a longer investment horizon. A current income of 2.4% per year represents only 0.2% in one month, but 12% in 5 years.

Adjusting the current income for non-flat curves

Assuming flat yield and spread curves, determining current income is easy. In case of non-flat curves, current yields can be determined using forward rates. For example, assuming a 5-year interest rate of 1.2% and a 4-year interest rate of 1%, the current yield of a risk-free 5-year (zero-coupon) bond can then be determined from the 1-year forward rate in 4 years. It is thus calculated as follows:

$$R_2 = 5 \cdot 1.2\% - 4 \cdot 1\% = 2\%$$

For positively sloped curves, the forward rates are always above the initial curves. This means that there is more current income than the initial curve indicates. For negatively sloped curves, exactly the opposite is true. Because each coupon bond can be represented as a combination of zero-coupon bonds, the current income of a coupon bond can be determined from the individual current income of the zero coupon bonds.

Applying the method to portfolio returns

The practitioner's method for approximating the return of a single bond can also be applied to an entire bond portfolio. There are different possibilities and degrees of differentiation. The simplest but least differentiated method is to approximate the portfolio with a single synthetic bond. This synthetic bond has the same duration and the same DTS as the portfolio. The approximated expected return of this synthetic bond is equal to the expected return of the portfolio. The other extreme would be to calculate the approximated expected return for each individual bond in the portfolio using the practitioner's method and to infer the expected portfolio return via the portfolio weighting.

A good compromise is representing the portfolio using a set of 10 - 20 synthetic bonds. These take into account the maturity as well as the rating or sector structure of the portfolio. In contrast

[1] For improved accuracy, convexity and/or higher moments can be taken into account.

FIG. 1 RETURN EXPECTATIONS IN ONE YEAR FOR THE SBI A-BBB INDEX

	Annualised returns	Changes in the interest rate level in 1 year					
		-1.0%	-0.5%	-0.3%	0.0%	0.5%	1.0%
Relative changes in the spread levels in 1 year	-100%	11.79%	9.92%	9.01%	8.12%	6.38%	4.71%
	-50%	8.78%	6.91%	6.00%	5.11%	3.38%	1.71%
	0%	5.88%	4.01%	3.10%	2.21%	0.48%	-1.20%
	50%	3.08%	1.21%	0.30%	-0.59%	-2.32%	-3.99%
	100%	0.38%	-1.49%	-2.40%	-3.29%	-5.03%	-6.70%

Source: LOIM. For illustrative purposes only. As at 31 August 2023.

FIG. 2 RETURN EXPECTATIONS IN FIVE YEARS FOR THE SBI A-BBB INDEX

	Annualised returns	Changes in the interest rate level in 5 years					
		-1.0%	-0.5%	-0.3%	0.0%	0.5%	1.0%
Relative changes in the spread levels in 5 years	-100%	3.21%	3.04%	2.96%	2.88%	2.73%	2.60%
	-50%	2.87%	2.69%	2.61%	2.53%	2.39%	2.25%
	0%	2.54%	2.37%	2.29%	2.21%	2.06%	1.93%
	50%	2.24%	2.07%	1.98%	1.91%	1.76%	1.63%
	100%	1.96%	1.78%	1.70%	1.62%	1.47%	1.34%

Source: LOIM. For illustrative purposes only. As at 31 August 2023.

to approximating via a single synthetic bond, this method allows a more differentiated mapping of the portfolio-specific properties without having to model all the bonds in the portfolio. The expected portfolio return is, therefore, derived from the expected returns of these 10-20 synthetic bonds.

This method leads to the following return expectations over the next year for the SBI A-BBB index (figure 1).

The influence of the first return component, using changes only in the systematic risk factors of interest rates and spreads, is clearly evident with a forecast horizon of one year.

The second return component, incorporating current income, dominates above all for longer-dated investment horizons, as shown in figure 2. If, for example, the forecast horizon is extended to 5 years, the annualised return figures in the various scenarios are all positive and also appear to converge toward a scenario of unchanged interest rates and spreads (or a no-change scenario).

In fact, it can be theoretically shown that for a portfolio with a constant risk profile over time, there is a so-called break-even investment horizon for which the expected annualised return is always equal to the return from the no-change scenario (2.21% in the above case), irrespective of the assumed scenario for interest rates and spreads. This investment horizon is 2*(portfolio duration) - 1.

The benefits of a broader method

Using a practitioner's method to approximate both individual bond returns and bond portfolio returns is a broader and more comprehensive method than a straight yield to maturity approach. For investment-grade bonds, the practitioner's method is comprised of two steps that take into account the duration, duration times spread (or the credit sensitivity of the bond), systematic factors and the length of the return period. For non-flat curves, current yields can be determined using forward rates. Lastly, we complete our analysis by simulating portfolio returns over the next one-year and five-years for the SBI A-BBB index.

IMPORTANT INFORMATION