Total Return (in USD): Basic Segmentation

Total Return (in USD) ≈

Contribution from yield
[= beginning-of-period yield * days in holding period / 360]

+ Contribution from benchmark-rate move
[= -1 * interest-rate duration * yield-change of comparable-duration US Treasury]

+ Contribution from spread
[= -1 * spread duration * spread change]

+ Contribution from currency
[= Exchange-rate (USD/local currency) effect]

Spread Contribution in greater detail

Contribution from Spread ≈

Systematic Component
[= -1 * spread duration * applicable market move [a]]

+ Idiosyncratic Component
[= -1 * spread duration * idiosyncratic spread change]

[a] The applicable spread change of the market is typically estimated by the spread change of an industry-standard benchmark to which the security might belong. For example, the systematic portion of the spread change of a single-B rated corporate could be estimated by the change in option-adjusted spread (OAS) of the Barclays U.S. High-Yield Corporate Index, Single-B component.

Contribution from Term Structure

Chop the treasury yield curve into duration buckets.

Then, for each duration bucket

* calculate the portfolio's interest-rate duration-dollar exposure (= weight * average duration)
* calculate the benchmark's interest-rate duration-dollar exposure
* calculate net exposure = portfolio exposure – benchmark exposure
* determine the yield change for a reference treasury falling in the bucket
* determine bucket's contribution to excess return from yield change =
  - net exposure * Δ yield of an applicable treasury

Contribution from term structure due to rate moves [a] = sum of bucket contributions

Contribution from duration posture [b]

= sum of bucket contributions where the same Δyield (i.e., the parallel yield curve shift) is applied

Contribution from curve posture [c] = contribution from term structure – contribution from duration posture

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[a] This calculation speaks to the impact of the distribution of duration-dollars along the yield curve. There is a separate calculation that isolates the term-structure contribution due to the distribution of dollars along the curve. This second effect examines how the distribution of dollars along the curve influences the yield of the portfolio relative to the yield of the benchmark.

[b] This is the contribution to excess return from a parallel yield curve shift.

[c] This is the contribution to excess return from a reshaping of the yield curve.

General framework for factor-based performance attribution

Contribution from duration posture (parallel yield curve shift) as defined on page 3

Contribution from curve posture (curve reshaping) as defined on page 3

Contribution from yield

Contribution from sector weighting (systematic spread risk factor)
= - net spread-duration dollar exposure * spread change of applicable benchmark sector

Contribution from issue selection within a sector (nonsystematic spread risk factor)
- group portfolio constituents by sector
- calculate spread duration-dollar exposure of each constituent in the sector
- sum contributions of individual securities, where
  contribution = -spread duration-dollar exposure * idiosyncratic segment of spread change [a]

[a] As defined on page 2, a security's spread change is the sum of the security's systematic spread change (i.e., the spread change defined by the applicable segment of the benchmark) and a residual, which is the security's non-systematic (idiosyncratic) spread change.

Two Factset Frameworks for Performance Attribution

Returns-Based Attribution
(Factset two-factor model)

- view portfolio/benchmark as a collection of sectors
- each sector contributes return
  (return contribution = average weight * average return)
- sectors' return contributions sum to the portfolio (or benchmark) return
- excess return is explained by differences between sector return contributions in the portfolio and the benchmark
- complete flexibility with sector definition as long as portfolio and benchmark constituents distribute comprehensively and uniquely across sectors
- no explicit reference to measures of price sensitivity (i.e., various forms of duration)

Hybrid Model

Risk-Based Attribution
(as illustrated on page 4)

- view portfolio/benchmark as a collection of risk factors and loadings on those factors
- excess return arises from differences in factor loadings
- challenging to identify a compact collection of non-overlapping risk factors that comprehensively explains excess return

Factset four-factor model is a hybrid approach lying between these two extremes.

Allocation Effect

= (portfolio sector weight – benchmark sector weight) *
(benchmark sector return – total benchmark return)

Selection Effect

= portfolio sector weight *
(portfolio sector return – benchmark sector return)

Note: This approach makes no explicit reference of interest-rate or spread duration. The approach has its best applicability to portfolios with a mostly bottoms-up investment style.

Factset framework (four-factor model)

Shift effect (contribution from duration)

- as defined on page 3, although the estimate of the magnitude of the parallel shift may be based on something other than a duration-weighted average of yield shifts across the curve

Twist effect (contribution from curve reshaping)

- as defined on page 3

Allocation effect

Selection effect

- allocation and selection effects are based on a decomposition of residual return (where residual return is total return excluding the contribution from rate move [a,b])

- Allocation effect

  = (portfolio sector weight – benchmark sector weight) *
  (benchmark sector residual return – total benchmark residual return)

- Selection effect

  = (portfolio sector weight) * (portfolio sector residual return – benchmark sector residual return)

[a] The contribution from rate move would have already been explained by the shift and twist effects.
[b] Residual return should approximate the sum of the contributions of spread duration, yield, and currency as defined on page 1.