

READING

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Return Attribution (an excerpt)

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RETURN ATTRIBUTION: AN OVERVIEW

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To evaluate the performance of an actively managed portfolio, analysts often compare the portfolio's returns with those of its assigned benchmark. If we assume that the benchmark return represents the performance available from a passive investment in some appropriately selected segment of the market, then the difference between the performance return and the benchmark return represents the performance as a result of active investment decisions. The difference between the return on a portfolio and the return on its assigned benchmark is known in the investment performance field as the portfolio's **excess return**.¹ In this reading, outperformance (underperformance) is sometimes used to refer to positive (negative) excess return with respect to a benchmark. A dictionary definition of the verb "attribute" is "to explain something by indicating a cause." Return attribution can be defined as follows:

- **Return attribution** is a set of techniques used to identify the sources of the excess return of a portfolio against its benchmark in order to understand the consequences of active investment decisions.

2.1 Purposes of Return Attribution

Return attribution is part of the feedback loop of the portfolio management process, quantifying active decisions of portfolio managers, monitoring consistency, and informing senior management and clients. As a feedback mechanism, return attribution can be thought of as "backward looking" or *ex post*, meaning that it is used to evaluate the investment decisions for some historical time horizon. Return attribution allows us to look across a specific time horizon and identify which investment decisions have either added or detracted value from the portfolio, relative to its benchmark.

¹ The term *active return* is also frequently used to describe the excess return of a portfolio in relation to the benchmark return. We are consistent in using *excess return* only in the one sense given in the current reading; in other contexts, the reader should be aware that it can refer to a return in excess of the risk-free return.

A Common Type of Return Attribution

Suppose a portfolio's return for the past year was 5.24% and the portfolio's benchmark return for that same time period was 3.24%. In this case, the portfolio achieved a positive arithmetic excess return of 2.00% ($5.24\% - 3.24\% = 2.00\%$) over the past year.

Return attribution can then be applied to understand how the 2.00% was achieved. Was the return achieved by selecting securities that performed well relative to the benchmark or avoiding benchmark securities that performed relatively poorly (*security selection*)? Or was the return achieved by choosing to over-invest in (or overweight) a particular economic sector or asset category that outperformed the total benchmark for that period or to underinvest in or avoid (or underweight) an asset category that underperformed the total benchmark (*asset allocation*)?

Models of equity return attribution often attempt to separate the investment process into those two key decisions—selection and allocation—assigning both a magnitude and direction (plus or minus) for both decisions. For instance, using the above data, we might calculate the return attribution results shown in Exhibit 1:

**Exhibit 1 Total Portfolio Return Attribution Analysis
(Time Period: Past 12 Months)**

Portfolio Return	Benchmark Return	Excess Return	Allocation Effect	Selection Effect
5.24%	3.24%	2.00%	-0.50%	2.50%

As we noted, the investment decisions generated a positive excess return of 200 basis points (bps) relative to the benchmark. We use the return attribution analysis to see how this 200 bps was generated. First, we should note that the *negative* allocation effect indicates that the asset allocation decisions over the past 12 months, whatever they were, had a negative impact on the total portfolio performance. They *subtracted* 50 bps from the excess return. In contrast, the *positive* selection effect indicates that the security selection decisions—decisions to overweight or underweight securities relative to their benchmark weights—*added* 250 bps to the excess return. Our return attribution analysis implies that the portfolio manager's security selection decision was far superior to his or her asset allocation decision for the time period examined.

When conducting a return attribution analysis, we need to also consider the different perspectives important to different roles within the investment process. The fund sponsor, for example, will be interested in different parts of the investment process than the portfolio manager because the fund sponsor will delegate some portion of the management to the portfolio manager. The fund sponsor will want to understand if any added value from the portfolio manager is consistent through time and consistent with the manager's stated investment discipline. Any added value derived from a source other than that explicitly described in the investment process may be random or not repeatable. Return attribution analysis can provide evidence in support of the claimed competencies of the portfolio manager. Prospective clients will want evidence of the investment process supported by return attribution analysis.

Return attribution may also identify other problems, such as holding too much cash in a rising market or unnecessarily high transaction costs when implementing part of the decision process.

2.2 Return Attribution vs. Return Contribution Analysis

Occasionally, performance analysts may conduct an *absolute* return attribution analysis, also known as return contribution analysis. We refer to it as absolute return attribution because, unlike return attribution as ordinarily understood, it is not calculated relative to a benchmark. Return contribution analysis uses only the weights and returns of the portfolio (without reference to the weights and returns of a benchmark).

- **Return contribution analysis (absolute return attribution)** identifies the contributions of portfolio components to the total return of a portfolio.

For return contribution analysis, we look at portfolio weights, component security or sector returns, and the weighted return or *contribution to return*. Contribution to return is calculated as the product of the security or sector weight multiplied by the security/sector return, as in:

$$R = \sum_{i=1}^{i=n} w_i R_i$$

where

- n = the number of sectors or securities in the portfolio
- w_i = the weight of the sector or security in the portfolio
- R_i = the return of the sector or security in the portfolio
- $w_i R_i$ = the contribution to portfolio return

The sum of the contributions to return is equal to the total portfolio return, R . Consider the example of a portfolio containing the three securities listed in Exhibit 2.

Exhibit 2 Return Contribution Analysis

	Weight (%)	Return (%)	Contribution(%)
Security A	25	4.80	1.20
Security B	50	2.50	1.25
Security C	25	-1.20	-0.30
Portfolio Total	100	2.15	Sum = 2.15

For each security, there is a weight, a return, and a contribution to return. The sum the contributions to return gives the total portfolio return: $1.20 + 1.25 + -0.30 = 2.15$.

This return contribution analysis indicates that securities A and B made similar contributions to the total return (1.20 and 1.25 respectively). Although security B had a much larger weight in the portfolio (50%) than security A (25%), security B's significantly smaller return (2.5% versus 4.8%) produced a contribution almost equal to security A. Security C, with a negative return, had a negative contribution to the total portfolio return.

Return contribution analysis can tell us which securities have the greatest (and least) impact on the total portfolio return. But, as noted, the analysis does not include a comparison to a performance benchmark. So, although contribution analysis provides some insight into the *absolute* impact of individual securities (or groups of securities) on the portfolio, it is not informative about whether investment decisions added value *relative* to the benchmark.

EXAMPLE 1**Return Contribution Analysis**

Return contribution analysis can be used to:

- A** measure the investment risk relative to the benchmark.
- B** compare the relative impact of securities within a portfolio.
- C** identify the investment value added from the asset weighting decisions relative to the benchmark.

Solution:

B is correct. Return contribution analysis is used to compare the weighted returns of separate investments within a portfolio, thus allowing the impact of those separate investments to be compared.

2.3 Return Attribution vs. Risk Attribution

Complementary to return attribution is risk attribution. Whereas return attribution analyzes the consequences of active investment decisions on returns, risk attribution analyzes the risk consequences of such decisions. Depending on the purpose of the analysis, risk may be viewed in absolute or benchmark-relative terms. For example, when risk relative to a benchmark is the focus, a risk attribution analysis might identify and evaluate a portfolio's deviations from a benchmark's exposures to risk factors. Risk attribution is presented in detail in a separate reading.

Performance attribution is defined to include return attribution and risk attribution (although in practice "performance attribution" is frequently used to just mean "return attribution").

EXAMPLE 2**Return and Risk Attribution**

- 1** Return attribution can *best* be used to:
 - A** measure volatility within a portfolio.
 - B** adjust performance returns for external cash flows.
 - C** analyze the value added by active investment decisions.
- 2** Return attribution attempts to identify investment management value added by:
 - A** identifying which security selection decision was the best overall within the portfolio.
 - B** focusing on the analysis of holdings that have made the greatest contribution to return.
 - C** decomposing the excess return into the separate contributors to excess return from allocation and selection decisions relative to the benchmark.
- 3** Risk attribution is *best described* as concerned with identifying:
 - A** the level of risk in a portfolio.
 - B** contributions to a portfolio's alpha risk.
 - C** the contributors to risk either in a benchmark-relative or absolute sense.

Solution to 1:

C is correct. Return attribution attempts to analyze whether value was added by active investment decisions.

Solution to 2:

C is correct. A typical return attribution analysis includes a decomposition of the excess return into the excess return generated by the asset allocation and security selection decisions separately.

Solution to 3:

C is correct. Risk attribution provides insight into the key contributors to risk.

2.4 Effective Return Attribution

Although first developed as an aid for portfolio management, return attribution analysis is equally useful for senior management, client relationship specialists, risk controllers, operations staff, and sales and marketing professionals on the one hand and clients and prospective clients on the other hand. In identifying the sources of excess return, it is the tool that allows performance analysts to add value and to participate in the investment decision process.

In effect, return attribution analysis is the tool that converts performance measurement information from the back office to information that is useful to the middle office control function. Effective return attribution analysis requires a deep understanding of the investment decision process; return attribution must reflect the active decisions of the portfolio manager. There is little value in analyzing factors that are not part of the investment decision process.

An effective return attribution process must:

- reconcile to the total portfolio return,
- reflect the investment decision process,
- quantify the active decisions of the portfolio manager, and
- provide a complete understanding of the excess return of the portfolio.

If the return generated by the return attribution analysis does not reconcile to the return presented to the client, then at best the return attribution is incomplete and at worst the quality of the return attribution analysis is brought into doubt. If the return attribution does not reflect the investment decision process, then the analysis will be of little value to either the portfolio manager or client. For example, if the portfolio manager is a genuine bottom up stock picker who ignores sector benchmark weights, then any value in measuring the impact of sector allocation against these weights relates not to measuring success in stock picking but to gauging the unintentional sector return effects of the manager's investment discipline.

Return attribution provides a good starting point for a dialogue with clients, explaining both positive and negative aspects of recent performance. In fact, return attribution analysis is particularly important when performance is weak; portfolio managers must demonstrate an understanding of their performance, provide a rationale for their decisions, and generate confidence in their ability to add value in the future. When it accurately reflects the investment decision-making process, return attribution provides quality control for the investment process; it provides senior management with the tool they need to manage a complex business with multiple investment strategies.

EXAMPLE 3**Effective Return Attribution**

An effective return attribution process is best described as:

- A** adjusting fully for risk.
- B** identifying poor performance.
- C** quantifying the investment decision process.

Solution:

C is correct. Return attribution analysis does not focus on adjusting for risk, nor does it attempt to identify poor performance alone. Return attribution may be effective if it quantifies and thus reflects the investment decision process.
