Beware of Phantom Alpha

# The Issue We'll Address

The misrepresentation of excess return (alpha) that can arise when the frequency of rebalancing a blended benchmark differs from the portfolio (or composite, etc.).

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# Important to recall …

- The GIPS® standards require both asset managers and asset owners to disclose the frequency of rebalancing blended benchmarks
- But <u>not</u> the frequency of rebalancing the composite
- As we will show, both are needed

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# Rebalancing blended benchmarks: simple

- The math is relatively simple:

$$R^{Blended} = \sum_{i=1}^{n} A_i \times r_i$$

- <u>The challenge</u>: do your market index licenses <u>permit you</u> to blend the individual indexes together?
- A topic for another time.

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# The benchmark data we'll use

|  | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns |
|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% |

# We'll rebalance monthly

|  | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns |
|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% |

Starting with the first month:

$$R_{Month1}^{Blended} = \sum_{i=1}^{n} A_i \times r_i =$$

$$60\% \times 5.00\% + 40\% \times 3.00\% = 4.20\%$$

# Continuing with the remaining months

|  | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns | Quarter Returns |
|---|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% | 15.75% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% | 6.11% |
| Blended Index | 100% | 4.20% | 3.20% | 4.00% | 11.84% |

$$R_{Month2}^{Blended} = \sum_{i=1}^{n} A_i \times r_i =$$

$$60\% \times 4.00\% + 40\% \times 2.00\% = 3.20\%$$

$$R_{Month3}^{Blended} = \sum_{i=1}^{n} A_i \times r_i =$$

$$60\% \times 6.00\% + 40\% \times 1.00\% = 4.00\%$$

$$R_Q^{Blended} = \prod_{j=1}^{m} (r_j + 1) - 1 = (4.20\% + 1) \times (3.20\% + 1) \times (4.00\% + 1) - 1 = 11.84\%$$

A challenge: blending less frequently; e.g., quarterly

- Since the benchmark doesn't hold assets, less frequent rebalancing is a challenge, because we need to compound the returns
- A proposed method: using notional values
- We define a starting notional value; we'll use 1,000
- And allocate it across the sectors, asset classes, etc., based on the strategic weights, for the first month

# Notional values for the benchmark

- Each month's notional values are adjusted, based on that month's returns, resulting in an ending notional value

$$NV_m = \left(1 + r_m^i\right) \times NV_{m-1}^{Ending}$$

- For Month 1, our notional value is 1,000, split 60% (600) to the equity index and 40% (400) to the bond index

# Month 1's Notional Values

- Each month's notional values are adjusted, based on that month's returns, resulting in an ending notional value

|  | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns |
|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% |

$$NV_{Month1}^{EquityIndex} = \left(1 + 5.00\%\right) \times 600 = 630.00$$

$$NV_{Month1}^{BondIndex} = \left(1 + 3.00\%\right) \times 400 = 412.00$$

# Month 2's and 3's Notional Values

|  | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns |
|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% |

$$NV_{Month2}^{EquityIndex} = \left(1 + 4.00\%\right) \times 630 = 655.20$$

$$NV_{Month2}^{BondIndex} = \left(1 + 2.00\%\right) \times 412 = 420.24$$

$$\sum_{i=1}^{n} NV_{Month2}^{i} = 655.20 + 420.24 = 1,075.44$$

$$NV_{Month3}^{EquityIndex} = \left(1 + 6.00\%\right) \times 655.20 = 694.51$$

$$NV_{Month3}^{BondIndex} = \left(1 + 1.00\%\right) \times 420.24 = 424.44$$

$$\sum_{i=1}^{n} NV_{Month3}^{i} = 694.51 + 424.44 = 1,118.95$$

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# The Blended Benchmark's Blended Returns

We use each month's notional values to calculate its blended return

$$BB_{Month1} = \frac{\sum_{i=1}^{n} NV_1^i}{\sum_{i=1}^{n} NV_0^i} = \frac{630.00 + 412.00}{1,000} = 4.20\%$$

$$BB_{Month2} = \frac{\sum_{i=1}^{n} NV_2^i}{\sum_{i=1}^{n} NV_1^i} = \frac{655.20 + 420.24}{1,042.00} = 3.21\%$$

$$BB_{Month3} = \frac{\sum_{i=1}^{n} NV_3^i}{\sum_{i=1}^{n} NV_2^i} = \frac{694.51 + 424.44}{1,075.44} = 4.05\%$$

# Two ways to calculate the quarterly return

- Geometrically link the monthly blended returns:

$$R_Q^{Blended} =$$

$$\prod_{j=1}^{m} (1 + r_j) - 1 = (1 + 4.20\%) \times (1 + 3.21\%) \times (1 + 4.05\%) - 1$$

$$= 11.90\%$$

- Divide the ending notional value by the starting notional value [we can do this because there are no cash flows]

$$R_Q^{Blended} = \frac{NV_{End}}{NV_{Start}} - 1 = \frac{1,118.95}{1,000} = 11.90\%$$

# The Blended Benchmark's notional values and returns

| Notional Values | | | | |
|---|---|---|---|---|
| Start | Month 1 | Month 2 | Month 3 | Quarterly |
| 600.00 | 630.00 | 655.20 | 694.51 | Blend |
| 400.00 | 412.00 | 420.24 | 424.44 | |
| Totals | 1,042.00 | 1,075.44 | 1,118.95 | 11.90% |
| Blended Returns | 4.20% | 3.21% | 4.05% | 11.90% |

# Note the return differences: quarterly vs. monthly rebalancing

| Notional Values | | | | |
|---|---|---|---|---|
| Start | Month 1 | Month 2 | Month 3 | Quarterly Blend |
| 600.00 | 630.00 | 655.20 | 694.51 | |
| 400.00 | 412.00 | 420.24 | 424.44 | |
| Totals | 1,042.00 | 1,075.44 | 1,118.95 | 11.90% |
| Blended Returns | 4.20% | 3.21% | 4.05% | 11.90% |

| | Strategic Weights | Month 1 Returns | Month 2 Returns | Month 3 Returns | Quarter Returns |
|---|---|---|---|---|---|
| Equity Index | 60% | 5.00% | 4.00% | 6.00% | 15.75% |
| Bond Index | 40% | 3.00% | 2.00% | 1.00% | 6.11% |
| Blended Index | 100% | 4.20% | 3.20% | 4.00% | 11.84% |

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# We will now turn our attention to the portfolio

- Our portfolio begins with a value of 5,000,000
- Its strategic weights match the benchmark's (60/40)
- And, as a passive strategy, it gets the same returns

# The portfolio's data

- Because we rebalance quarterly, the returns are cumulative (i.e., they benefit from the prior periods' results
- Note how we get the same result had we rebalanced the benchmark quarterly!

| Portfolio | Month 1 | | | Month 2 | | | Month 3 | | | Quarter Return |
|---|---|---|---|---|---|---|---|---|---|---|
| | Return | $V_0$ | $V_E$ | Return | $V_0$ | $V_E$ | Return | $V_0$ | $V_E$ | |
| Equities | 5.00% | 3,000,000 | 3,150,000 | 4.00% | 3,150,000 | 3,276,000 | 6.00% | 3,276,000 | 3,472,560 | 15.75% |
| Bonds | 3.00% | 2,000,000 | 2,060,000 | 2.00% | 2,060,000 | 2,101,200 | 1.00% | 2,101,200 | 2,122,212 | 6.11% |
| Totals | 4.20% | 5,000,000 | 5,210,000 | 3.21% | 5,210,000 | 5,377,200 | 4.05% | 5,377,200 | 5,594,772 | 11.90% |

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# The problem:

When we rebalance the portfolio less frequently than the benchmark (in this case, quarterly)

- Portfolio return = 11.90%

$$R^{Excess} = R_P - R_B = 11.90\% - 11.84\% = 0.06\%$$

- Benchmark return = 11.84%

- We get <u>phantom alpha</u> of 0.06%

| | Month 1 | | | |
|---|---|---|---|---|
| | **Benchmark** | | **Portfolio** | |
| | Weights | Return | Weights | Return |
| **Equities** | 60% | 5.00% | 60% | 5.00% |
| **Bonds** | 40% | 3.00% | 40% | 3.00% |
| **Totals** | 100% | 4.20% | 100% | 4.20% |

| | Month 2 | | | |
|---|---|---|---|---|
| | **Benchmark** | | **Portfolio** | |
| | Weights | Return | Weights | Return |
| **Equities** | 60% | 4.00% | 60.46% | 4.00% |
| **Bonds** | 40% | 2.00% | 39.54% | 2.00% |
| **Totals** | 100% | 3.20% | 100% | 3.21% |

| | Month 3 | | | |
|---|---|---|---|---|
| | **Benchmark** | | **Portfolio** | |
| | Weights | Return | Weights | Return |
| **Equities** | 60% | 6.00% | 60.92% | 6.00% |
| **Bonds** | 40% | 1.00% | 39.08% | 1.00% |
| **Totals** | 100% | 4.00% | 100% | 4.05% |

| | Quarter Returns | |
|---|---|---|
| | **Benchmark** | **Portfolio** |
| **Equities** | 15.75% | 15.75% |
| **Bonds** | 6.11% | 6.11% |
| **Totals** | 11.84% | 11.90% |

# Is this 6 bp difference real or phantom?

| | Quarter Returns | |
|---|---|---|
| | Benchmark | Portfolio |
| Equities | 15.75% | 15.75% |
| Bonds | 6.11% | 6.11% |
| Totals | 11.84% | 11.90% |

- Did our portfolio <u>really</u> outperform by 0.06%?
- Isn't this alpha attributable to rebalancing less frequently, allowing the returns to accumulate?
- Since equities > bonds, its allocation increased, along with its return and the overall return

# Is this such a big deal?

- In our example, there's a 6 bp difference
- It could be higher, right?
- And, quarterly returns compound
- As do annual returns
- So, this small difference can increase, yes?
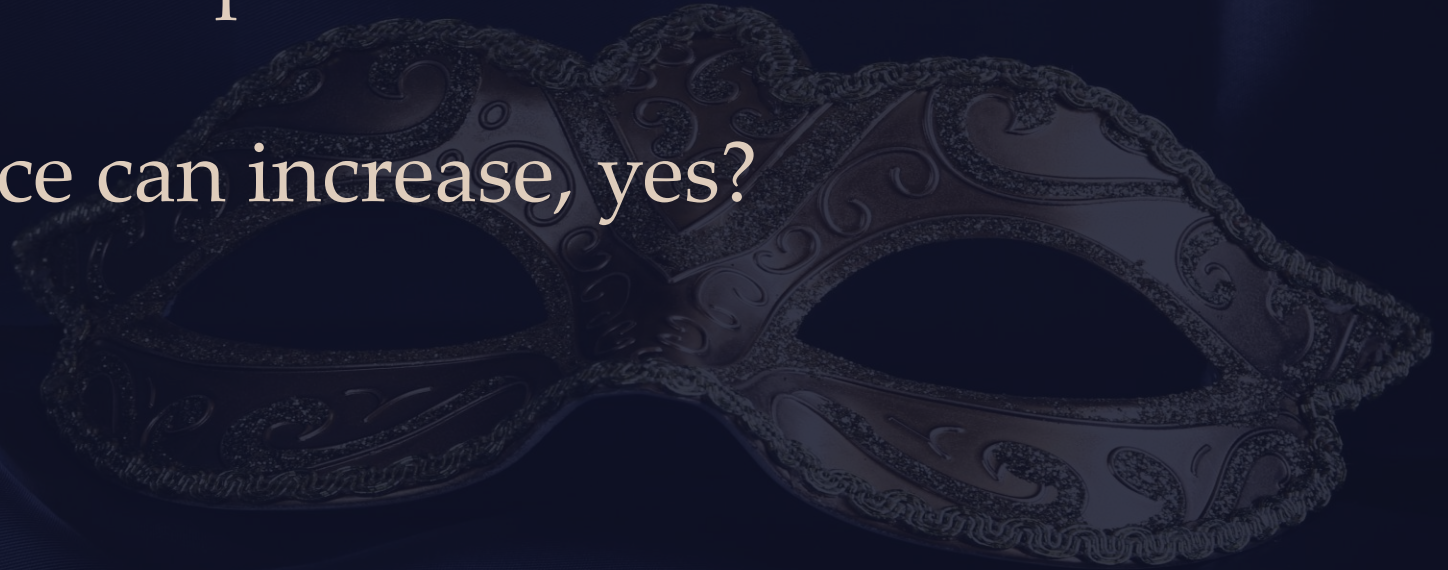
# How should this be handled?

- Ideally, rebalance the benchmark at the same time the portfolio is rebalanced
- The GIPS standards should require <u>both</u> the frequency of the rebalancing for the blended benchmark and the composite, to highlight any differences in timing
- Asset owner? Inquire into the timing of blended benchmarks vs. the portfolio

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# Your Thoughts?

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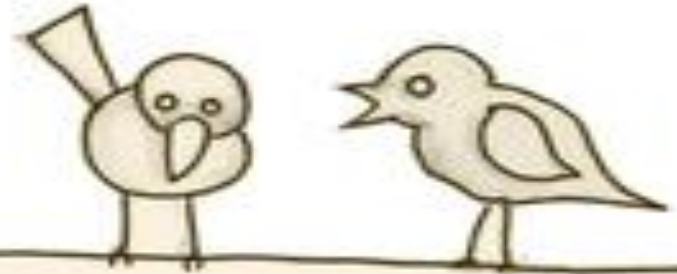
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