Case Study: Return Attribution based on Forward Scenarios

Overview:

Portfolio manager Peter is working with a self-made, high-net worth investor who is holding a very concentrated $10mil portfolio, with 70% in equities and 30% in bonds. The client's investment objective is to achieve a somewhat aggressive 10% return; without such a return, he may deploy the capital in his own business directly. Peter needs to find a better way to balance his client's risk and return objectives in different markets. The portfolio is shown in **Figure 1** below:

| Buy | Sell | Fields: Default ▾ | Calc. Horizon: 1 Year ▾ | Use Active Return | Include Cash | Use Weekly | Import | Export |

Description				Position	Weight	Market	Risk	Return	
Product		Asset Class	Currency ▴	Actual	Actual	Last Price	Volatility	Historical...	6m Beta
3M Co.		Equity	USD	2,000,000.01	20.00%	144.85	13.66%	19.77%	1.13
Air Products & Chemicals Inc.		Equity	USD	3,000,000.00	30.00%	131.48	18.31%	19.79%	1.70
Apple Inc.		Equity	USD	2,000,000.00	20.00%	100.86	21.86%	45.84%	1.31
SPDR Barclays Capital High Yield Bond		Fixed Income	USD	1,500,000.00	15.00%	40.57	4.03%	2.22%	0.31
iShares Core Total US Bond Market ETF		Fixed Income	USD	1,499,999.99	15.00%	108.61	2.54%	2.57%	-0.07
Total				10,000,000.00	100.00%			19.78%	1.03

Figure 1: 70-30 Equities-Bond HNW Portfolio

Now, he is interested in knowing how such a portfolio may perform under different market scenarios. In particular, his investor is taking such a concentrated approach to investing because he is not convinced that "alpha managers" are adding significant values after fees. Accordingly, Peter chooses the *Where Have All The Alphas Gone* scenario in order to see how the underperformance of hedge funds may affect his equity-bond portfolio. (**Figure 2**).

	Save Scenario	Delete Scenario	Description	Factor Significance							
Type	Index		Current	New	Change	Change %			Neg. Obs. Move	Pos. Obs. Move	
Equity	S&P 500 Index	▾	1985.44 ⬆	2084.71	99.27	5.00			-15.08%	23.30%	
	☐ S5 Financial		290.55	290.55	0	0.00%			-15.15%	19.50%	
	☐ S5 Health Care		721.38	721.38	0	0.00%			-7.95%	6.58%	
	☐ S5 Consumer		464.14	464.14	0	0.00%			-9.89%	14.90%	
	☐ S5 Industrials		471.53	471.53	0	0.00%			-8.32%	10.80%	
	☐ S5 Telecom Serv		160.40	160.4	0	0.00%			-16.84%	11.69%	
Bond	PIMCO Investment Grade Corpo	▾	102.550 ⬆	112.805	10.255	10.00			-9.07%	12.57%	
Forex	-NONE-	▾	0.0000	0	0	0.00			-100.00%	100.00%	
Commodity	-NONE-	▾	0.00	0	0	0.00			-100.00%	100.00%	

Hedge funds AUM is reaching a record last year despite the fact that they may be less rewarding than their popularity may suggest.

Full Description | Change Image

Figure 2: "Where Have all the Alphas Gone"

Peter sees that his client's portfolio may expect a one-year return of 15% under the *Where Have All The Alphas Gone* scenario, as shown in **Figure 3** on the next page. This is based on an Absolute Return view without the inclusion of any benchmark. Next, he needs to better understand what is the fair required return for each individual asset, in order for the portfolio to reach its target 15% return.

Description		Position	Weight	Return	Where Have All The Alphas Gone		
Product	Asset Class	Actual	Actual	Historical...	Pos Chg	Asst Chg	Scen Prc
3M Co.	Equity	2,000,000.01	20.00%	19.77%	0.76%	3.81%	150.37
Air Products & Chemicals Inc.	Equity	3,000,000.00	30.00%	19.79%	2.61%	8.69%	142.91
Apple Inc.	Equity	2,000,000.00	20.00%	45.84%	9.74%	48.68%	149.96
SPDR Barclays Capital High Yield Bond	Fixed Income	1,500,000.00	15.00%	2.22%	1.34%	8.93%	44.19
iShares Core Total US Bond Market ETF	Fixed Income	1,499,999.99	15.00%	2.57%	1.05%	6.99%	116.21
Total		10,000,000.00	100.00%	19.78%	15.49%		

Figure 3: 70-30 Equity-Bond Portfolio underWhere Have All the Alphas Gone

Break-even Analysis:

First, he wants to know which level of fair return each asset (or asset class) will be required to produce in order to reach the overall 15% increase in portfolio historical return. Under the current market environment, naively believing that every asset should produce 15% proves unhelpful, because certain holdings such as cash or short-term bonds are very unlikely to yield 15%. Using the **Return Attribution** analytics on HedgeSPA (**Figure 4**), he finds out the unweighted scenario returns and break-even returns (or implied returns on the platform, which are returns that an asset has to produce to justify the risk that it contributes to the entire portfolio; it is proportional to the risk that the asset contributes to the portfolio) for each asset and asset class:

Return Attribution	Un ScenRet	Un ScenImplRet	Scen vs Impl	Scenario Comparison	Scenario Legend
Total	15.49%	15.49%	-	0% —— 50%	=== ScenRet
Equity	18.72%	21.54%	⬇		=== ScenImpl...
Developed Markets	18.72%	21.54%	⬇		
3M Co.	3.81%	14.98%	⬇		
Apple Inc.	48.68%	24.09%	⬆		
Air Products & Chemicals Inc.	8.69%	24.20%	⬇		
Fixed Income	7.96%	1.39%	⬆		
Developed Markets	7.96%	1.39%	⬆		
SPDR Barclays Capital High Yield B	8.93%	3.07%	⬆		
iShares Core Total US Bond Marke	6.99%	-0.29%	⬆		

Figure 4: Absolute Return Attribution under scenario Where Have All The Alphas gone

As shown in the table in **Figure 4** above, the current portfolio weights suggest that *Equity* as an asset class should make 20+% to justify its position in this portfolio, while *Fixed Income* only needs to make 1%. Seeing that equity markets are already "bubbly," he sees an opportunity to allocate more to *Fixed Income,* with a focus on tax-efficient fixed income instruments.

Peter notices that most of the assets under both *Equity* and *Fixed Income* asset classes are meeting their break-even return requirements – except for 3M and Air Products & Chemicals Inc., which expect returns of 11% and 16% above what they are currently producing, respectively. Using this information, Peter can make a judgment call on whether a certain asset will stand a reasonable chance of meeting its break-even return on a forward-looking basis. If Peter truly believes that equity markets are "bubbly," he should divest from equity products that seem unlikely to achieve their high break-even returns going forward, and focus on investing more in the other asset classes that may do so.

Peter thinks the high scenario absolute returns observed might be due to the market's overall upward trend, so he wants to analyze the relative performance of individual assets compared to their corresponding market indices. It will be cheaper to invest in market indices if these assets cannot outperform their own indices. To do that, Peter looks at **Return Attribution on Active Return** (**Figure 5**) to assess the quality of his asset or asset class selection decisions.

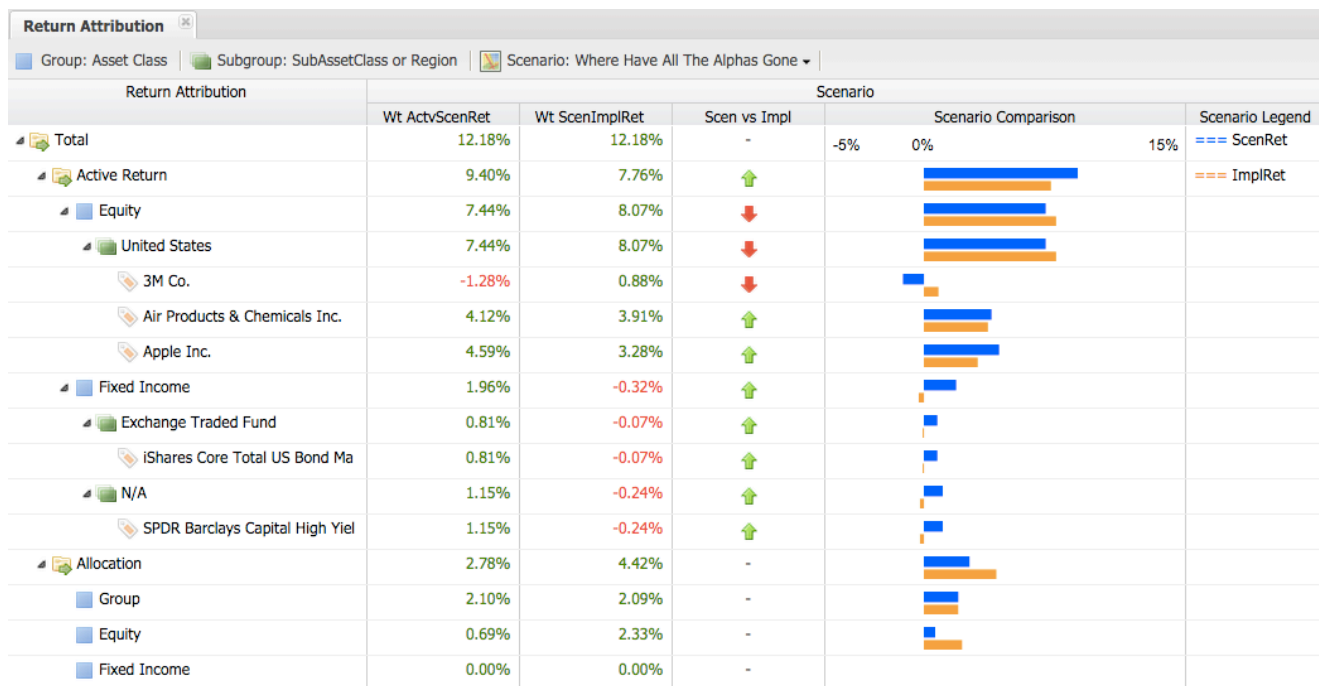| Return Attribution	Wt ActvScenRet	Wt ScenImplRet	Scen vs Impl	Scenario Comparison	Scenario Legend
Total	12.18%	12.18%	-	-5% 0% 15%	=== ScenRet
Active Return	9.40%	7.76%	⬆		=== ImplRet
Equity	7.44%	8.07%	⬇		
United States	7.44%	8.07%	⬇		
3M Co.	-1.28%	0.88%	⬇		
Air Products & Chemicals Inc.	4.12%	3.91%	⬆		
Apple Inc.	4.59%	3.28%	⬆		
Fixed Income	1.96%	-0.32%	⬆		
Exchange Traded Fund	0.81%	-0.07%	⬆		
iShares Core Total US Bond Ma	0.81%	-0.07%	⬆		
N/A	1.15%	-0.24%	⬆		
SPDR Barclays Capital High Yiel	1.15%	-0.24%	⬆		
Allocation	2.78%	4.42%	-		
Group	2.10%	2.09%	-		
Equity	0.69%	2.33%	-		
Fixed Income	0.00%	0.00%	-		

Figure 5: Return Attribution on Active Return under scenario Where Have All The Alphas Gone

The good news is that the whole portfolio is outperforming the market by 8% under this scenario. Especially notable are Apple and Air Products & Chemicals Inc. which are generating positive active return of 4+%, exceeding their corresponding break-even target returns. However, within *Equity*, 3M is underperforming the market and not meeting the requirement of their active return break-even rates as expected.

With both absolute and active returns exceeding their break-even rates, both bond products are doing better than their own market indices and contributing fairly low risk to the portfolio. Now Peter knows that he needs to find another equity product to replace 3M in order to maintain his client's exposure to manufacturing.

In addition, the 2.1% return in *Group Allocation* and 0.7% in *Equity Allocation* makes Peter realize that the legacy benchmark[1] that his client is using is not consistent with the portfolio. His client's legacy benchmark consists of 60% in equities and 40% in bonds, whereas the portfolio consists of 70% in equities and 30% in bonds. This difference between the portfolio and the benchmark results in a net long in 10% of bond and a net short in 10% of equity benchmarks, as shown under *Group Allocation*. Peter will further discuss with his client whether the legacy benchmark is appropriate or he may wish to consider changing his overall asset allocation.

Benchmark Details: "60-40 Equities-Bond Benchmark"

Index Name	Weight
iPath Dow Jones-UBS Energy Subindex Total Ret...	25.00%
iShares Dow Jones US Technology Sector Index ...	25.00%
iShares U.S. Treasury Bond ETF	15.00%
iShares MSCI AC World Index Fund	20.00%
iShares iBoxx $ High Yield Corporate Bd	15.00%
Total	100.00%

Figure 6: Portfolio Benchmarks

Product	Benchmark
3M Co.	iShares MSCI AC World Index Fund
SPDR Barclays Capital High Yield Bond	iShares iBoxx $ High Yield Corporate Bd
iShares Core Total US Bond Market ETF	iShares U.S. Treasury Bond ETF
Apple Inc.	iShares Dow Jones US Technology Sector Index ..
Air Products & Chemicals Inc.	iPath Dow Jones-UBS Energy Subindex Total Ret.

Figure 7: Product Benchmark Mapping

Keeping the bonds and Apple in the portfolio, Peter uses Air Products & Chemical Inc., Abbott Laboratories, and CF Industries Holdings to construct a portfolio that maximizes the Alternative Sharpe Ratio, a fourth-order measure that better describes the portfolio overall performance against downside risk (**Figure 8**).

| | Buy | Sell | Fields: Default ▾ | Calc. Horizon: 1 Year ▾ | Use Active Return | Include Cash | Use Weekly | Import | Export |

		Description			Position	Weight	Market	Risk	Return	
		Product	Asset Class ▾	Currency	Actual	Actual	Last Price	Volatility	Historical	6m Beta
		Abbott Laboratories	Equity	USD	2,685,500.00	26.86%	43.69	17.90%	24.12%	0.84
		Air Products & Chemicals Inc.	Equity	USD	2,083,000.00	20.83%	133.04	18.31%	20.84%	1.82
		CF Industries Holdings, Inc.	Equity	USD	-416499.99	-4.16%	259.71	20.66%	17.33%	1.45
		Apple Inc.	Equity	USD	2,000,000.00	20.00%	101.79	21.77%	45.02%	1.34
		Cash in USD	Cash	USD	647,999.98	6.48%	1.00	0.00%	0.00%	0
		SPDR Barclays Capital High Yield Bond	Fixed Income	USD	1,500,000.00	15.00%	40.67	4.00%	2.37%	0.43
		iShares Core Total US Bond Market ETF	Fixed Income	USD	1,500,000.00	15.00%	108.50	2.55%	2.31%	-0.03
	Total				10,000,000.00	100.00%			19.80%	0.87

Portfolio	Historical Return	Volatility	VaR	cVaR	MaxDD	Beta	SR	ASR	Skewness	Kurtosis	Treynor Ratio	Jensen's Measure	Semi-Deviation
Actual Portfolio	13.21%	8.58%	25.52%	30.00%	12.26%	-0.01	1.3073	1.1318	-0.62	4.45	-0.7307	0.1200	9.49%
Hypothetical Portfolio	15.00%	9.52%	27.16%	32.10%	14.24%	-0.17	1.3653	1.2473	-0.30	4.45	-0.5687	0.1418	9.82%

Figure 8: Portfolio with Maximum ASR

[1] A legacy benchmark is the benchmark that his client was using previously before migrating the account to Peter.

Conclusion:

Peter is happy to see that his client's very concentrated portfolio is doing well under a scenario in which hedge funds may underperform. Based on the analysis above, he is going to suggest to his client to sell the entire position of 3M and adjust the weight of Air Products & Chemicals. Additionally, he will suggest adding a new product Abbott Laboratories while taking a modest short position in CF Industries Holding to achieve a better mix of portfolio performance against its risk. He will also ask his client to consider either modifying his legacy benchmark or changing his overall asset allocation – unless such a misalignment is a deliberate "bet" consistent with his client's investment views.

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