MERLIN

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Understanding Investor Due Diligence

Executive Summary

The investor due diligence process has evolved with the growth of the hedge fund industry. What was once a short and rather perfunctory process has grown into one which today is highly quantitative and detailed. While there is no one-size-fits-all formula for investors, one certainty is that managers who understand the components of the due diligence process will have an easier time meeting the requests of investors.

This paper, based on numerous conversations with investors, seeks to identify and describe the components of a professional due diligence process – from simple annual return figures to detailed attribution analysis. The end goal is to provide a basic roadmap that can help fund managers understand the depth and breadth of this process and ultimately to help them achieve their fundraising goals.

Due Diligence Tools

Advanced Analytics for Investor Due Diligence		
	Traditional	**Advanced**
Historical Performance Data	Total Return Since Inception	Customized Date Ranges
Correlations vs. Benchmark	S&P 500 or Russell 2000	Client Selected Benchmarks with Customized Date Ranges
Composition	Gross and Net	Delta-Adjusted Exposure
Regression Analysis	Beta and Alpha	Graphical Analysis and Advanced Statistics
Attribution Analysis	Long and Short	Sector, Analyst, Stock Selection, Market Capitalization and Liquidity
Relative Attribution		Passive and Active Management, Asset Allocation and Stock Selection and Blended Benchmarks

Traditional Metrics for Due Diligence	
People	**Philosophy**
Process	**Performance**

INTRODUCTION

Prior to the institutionalization of hedge fund investing, investment decisions and allocations were largely made on the basis of performance numbers and the qualitative aspects of a fund: people, process and philosophy. Over the past decade, the needs of professional fund investors have resulted in the evolution of the investor due diligence process. Today, this process has expanded to encompass both qualitative and quantitative aspects of a fund and its performance. In order to successfully raise capital, managers must be able to articulately convey their value proposition, the components of their performance and the risks they take to achieve that performance.

This white paper represents an effort to describe the investor due diligence process, with a specific focus on the quantitative performance metrics. We have conducted dozens of interviews with fund of funds and direct investors in hedge funds in order to articulate the process as described by the professional fund investor. We found that the process has become very data driven and time intensive, requiring greater transparency and granularity than ever before.

It is not our intention to present an introduction to hedge fund statistics and reporting, but rather to write a white paper that helps managers better position their funds in a competitive capital raising environment.

MOVING THROUGH THE DUE DILIGENCE PROCESS - FROM QUALITATIVE TO QUANTITATIVE

Prior to selecting an investment target, hedge fund investors first determine the investment strategy to which they will be allocating capital. Strategies include:

- Equity fundamental value, fundamental growth and market neutral
- Event-driven funds
- Global macro-oriented products
- Relative value strategies, including fixed income

After generating a manager list within the strategy subset, the natural entry point for an analysis of a fund is a qualitative look at its people, process and philosophy. These elements comprise the backbone of all funds and are the source of their performance.

- **People**: This is typically the most important and decisive element of the due diligence process. Investors want to know who the decision makers are at a fund and where they received their training. A hedge fund manager's experience and pedigree is important in establishing him or her as an expert. While not necessary, working at a recognized firm with a proven ability to generate alpha lends credibility to their training. This may lead to a shorter due diligence process as it makes it easier for investors to check references. Investors will speak to previous employers and colleagues to determine a manager's exact role and specific contribution to performance.

- **Process**: Investors want to know that a manager has a proven process in place from idea generation, through research and portfolio construction, to risk management. Managers must be able to articulate their process in a concise manner to convey to investors that a fund's performance is consistent and repeatable.

> *"Any manager can tell a good story, due diligence is the process to make sure the story makes sense and that the numbers support it."*
>
> *- Paul Platkin of Arden Asset Management*

- **Philosophy**: A fund's philosophy is what differentiates it from the competition. In order to effectively communicate a fund's philosophy, a manager should focus internally on the aspects critical to their investing process. Investors want to understand where managers allocate the majority of their time and where they have true expertise.

These three main qualitative factors build a framework for a fund and are the first of a multi-step due diligence process. If a manager fails to meet an investor's standard on the qualitative front, then that manager will not have the opportunity to move forward in the due diligence process. That being said, qualitative analysis alone is not enough to form a complete picture or to ensure an allocation. As our friend Paul Platkin of Arden Asset Management explained, "*Any manager can tell a good story, due diligence is the process to make sure the story makes sense and that the numbers support it.*"

DEMYSTIFYING THE ELEMENTS OF A FUND'S PERFORMANCE

Performance is the result of a fund's people, process and philosophy. A fund's net performance number, however, is only the first step of the quantitative portion of the due diligence process. Investors will also want to understand what risks were taken along the way and where the money was made to determine if performance was a result of the process.

After a full review of returns and risk, an investor will take a deeper look at the numbers to understand the factors behind performance generation. The most common method, absolute attribution analysis, will answer questions regarding active versus passive investing and determine whether returns fall inside a manager's stated strategy and where managers are risking investor capital.

An investor conducting quantitative due diligence is similar to a painter painting a picture. With each layer of paint that is added to the canvas, the image begins to take shape and become clearer. Similar to a painting, hedge fund due diligence should be thought of in terms of overlays, with each overlay providing additional clarity to an investor's understanding of a fund and its returns. Once all of the overlays are in place, they provide the investor with a complete picture of the hedge fund manager. For the purposes of this white paper, we have identified three overlays that comprise the quantitative due diligence process:

- First overlay: Performance
- Second overlay: Risk
- Third overlay: Attribution Analysis

OVERLAY 1: PERFORMANCE

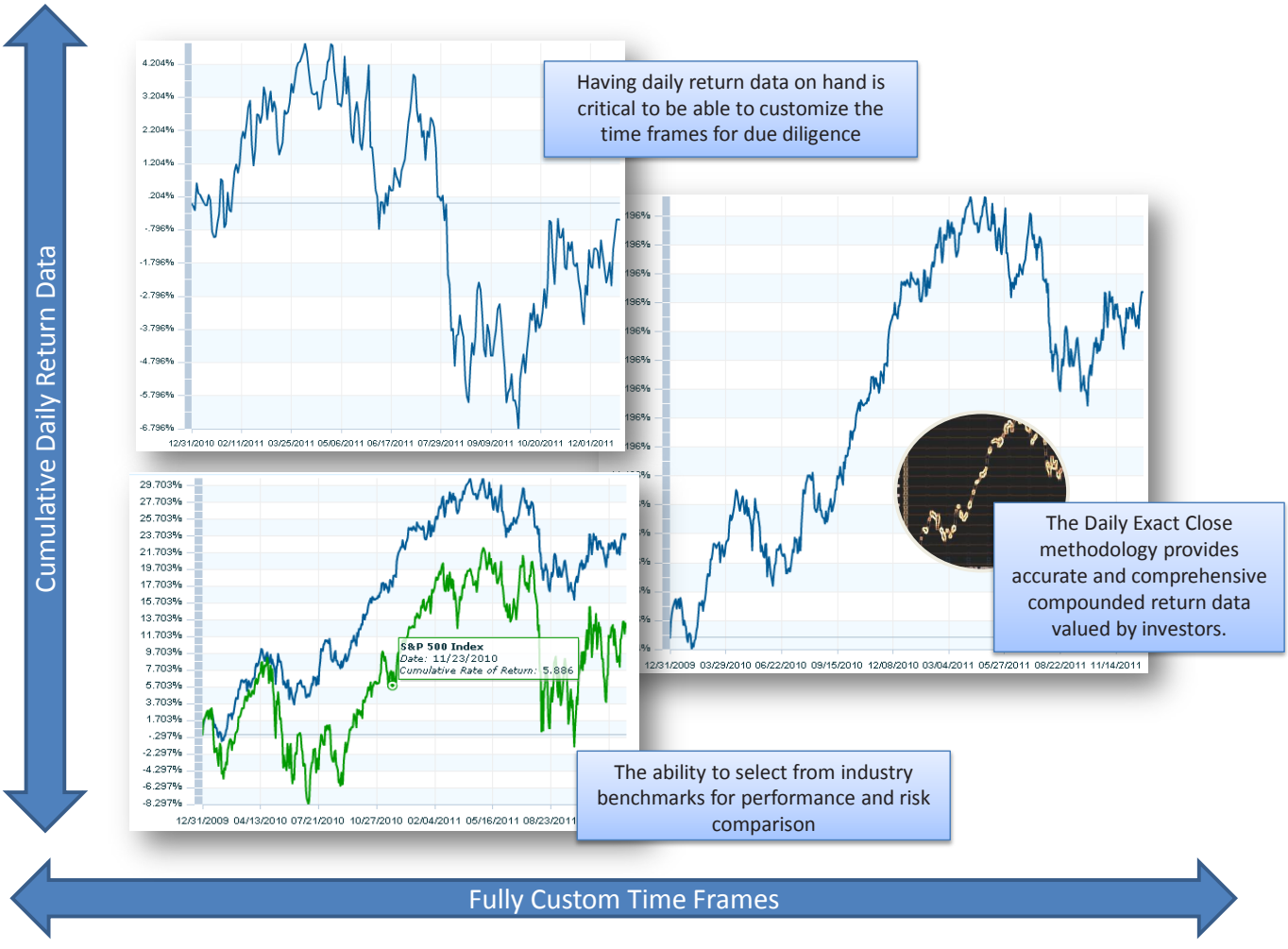
Performance data provides a static snapshot of a fund's returns and is often the first question on any potential investor's mind. Historical data is used by investors to predict the future returns of the fund's strategy. While past performance is not indicative of future results, it is one of the best tools that the investor has to evaluate the manager. Performance should be presented in a number of ways because the period in which investors are interested can vary.

Total return since inception, also called cumulative return, is used to calculate the compounded returns since the formation of the fund. Most funds will present this information visually and prominently.

The 12-month rolling return reports how the fund has performed in the prior 12 months or most recent year-long period. It is also a cumulative number like the total return discussed above, and neatly frames the more recent data for the investor to review.

Finally, the average monthly return is presented. Averages are simple to understand and set a month-to-month return expectation.

As a picture is worth a thousand words, the charts below represent the return figures discussed above. The charts show cumulative as well as periodic returns allowing the investor to get a full picture of the fund's returns over time. It is critical to maintain daily return data with the ability to customize the periods in order to meet investor requests for specific performance history.



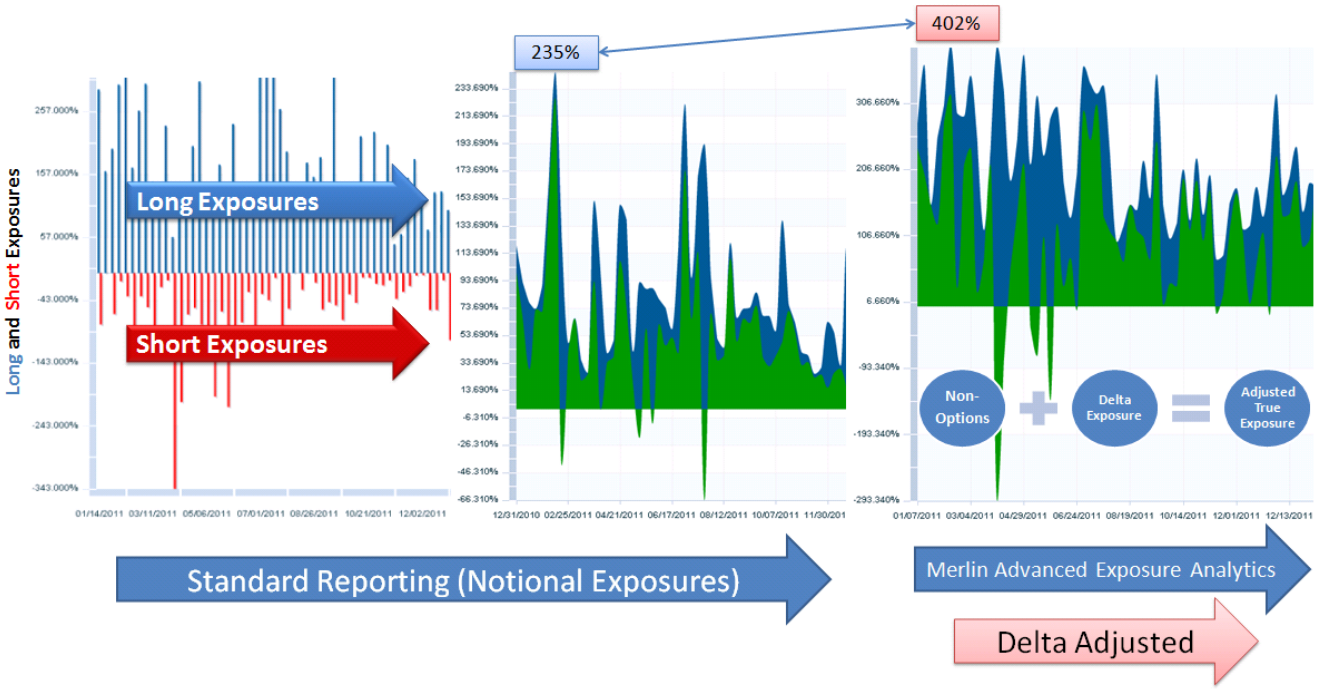
Returns, however, cannot be viewed in isolation. Investors still need to understand how a fund's total returns compare to the broader market, other managers or a passive benchmark. The last component of performance analysis is comparing a manager's returns to the appropriate benchmarks, as shown on the previous page. This enables an investor to understand if the manager's net returns have performed better or worse than the alternatives. Simply outperforming a benchmark is not enough to command an investment as total return alone does not paint a complete picture of the manager. Investors will want to know how much risk the manager employed to achieve those returns; which leads to an analysis of risk, the next step in the due diligence process.

"Simply outperforming a benchmark is not enough to command an investment as total return alone does not paint a complete picture of the manager."

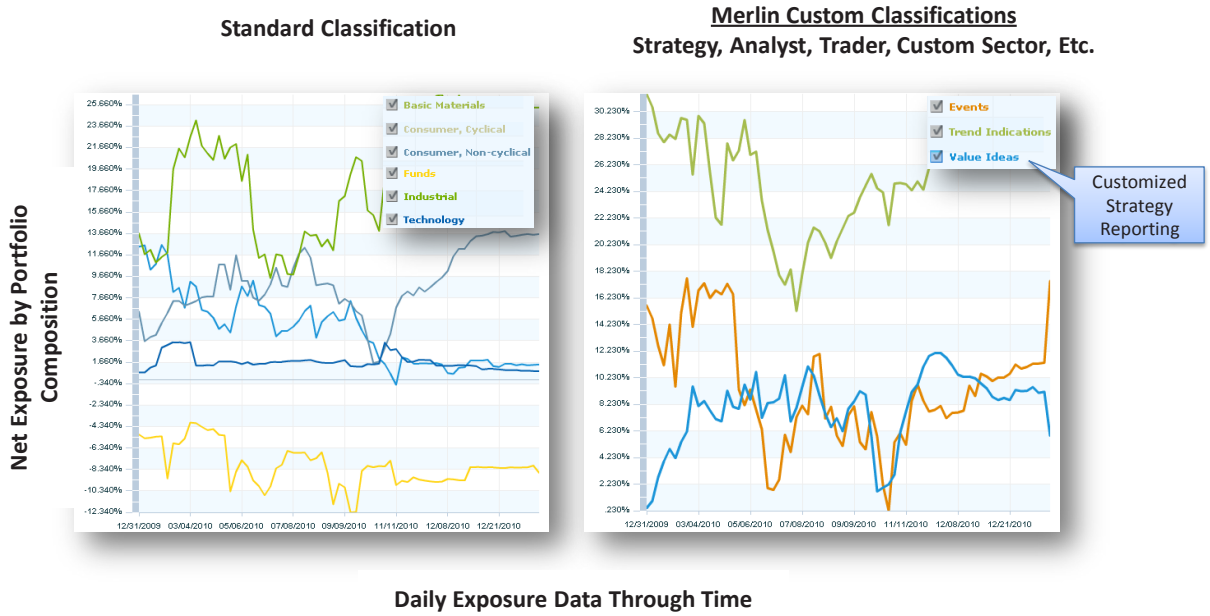
OVERLAY 2: RISK

Understanding fund exposure is the first step to understanding risk. However, contrary to popular belief, exposure does not equal risk. Risk is only introduced through exposure to risky or volatile assets. As indicated in the graphic, exposures can vary significantly over time, so single point references often do not show the complete picture. Investors will want to know the portfolio's exposure over the period in which performance is being presented. While averages are useful, presenting the information in time series is preferred as it allows investors to view intra-month exposures and to check for style drift.

Exposure is traditionally presented by long/short and net/gross. For a truly complete picture, advanced analytics of delta-adjusted exposures and beta-adjusted exposures should be incorporated to give an initial view of the risk normalized to a single equity risk number and also to a relevant index for the Beta comparison. As shown on the next page, a manager's delta-adjusted exposure can be significantly greater than their notional exposure. The data on the next page shows an extreme example; however, any manager utilizing derivatives should include this analysis to form a complete picture of exposure.



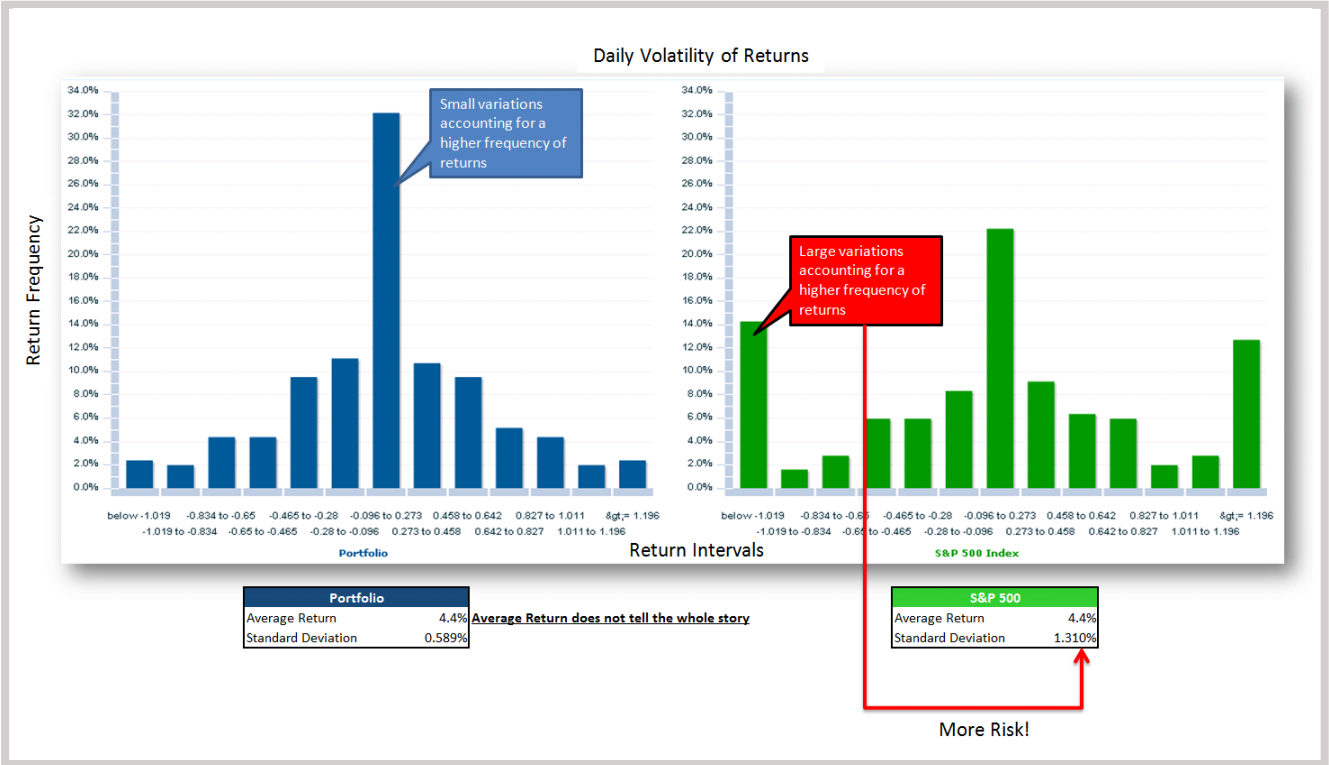
After understanding notional and delta exposures, investors will want to break down the portfolio's composition. Composition, like exposure, is not synonymous with risk, but rather a component of risk in the portfolio. Composition details where the investor committed or "risked" capital over a timeframe to achieve returns. A sophisticated investor will want to understand a time series of the portfolio's composition by asset class, sector, country, market capitalization and other relevant criteria. One of the most difficult analyses for a multi-strategy manager, and conversely one of the most valuable to an investor, is to classify and report portfolio composition by strategy as shown below. Attribution, which is the composition of returns, is discussed later in the paper.



Next, investors will want more information about how much risk a manager is taking in the portfolio to achieve his returns. As with the performance presentation, a visual representation of the data is an ideal way to start. Below we demonstrate one way of visualizing risk using a histogram of return data generated by our system for a sample portfolio.

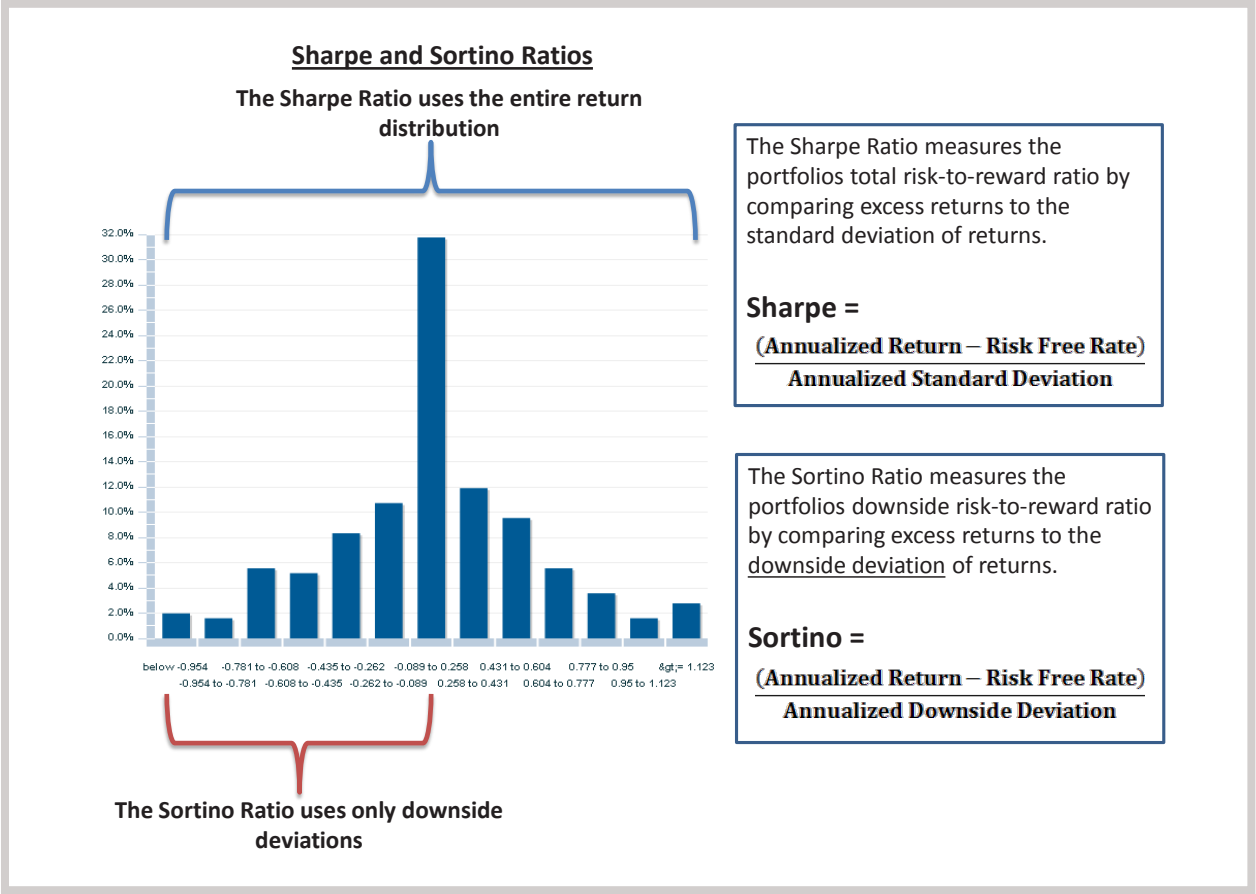
Risk represents the possibility that a portfolio will not achieve its desired results. This definition is critical because it frames risk from the perspective of the manager's strategy as certain strategies have more implicit risk than others. Like returns, risk should not be viewed in isolation and must be benchmarked to the market and to the strategy and taken in the context of the investor's goals in choosing a fund.

Standard deviation of returns is the most commonly used metric for risk. It is a statistical measurement of the volatility of a portfolio, and tells the investor how much variability there has been in the fund's returns. Standard deviation is also a historical measure that can provide insight into probable results. As shown in the graphic, the fund and the benchmark have the same average return, but the greater variation in the benchmark's return, as represented by the larger tails, results in a higher standard deviation and therefore greater risk. The higher the standard deviation, the greater the probability of the expected periodic returns deviating, in either direction, from the average or mean return. While the standard deviation does not imply direction, a higher standard deviation translates into greater potential for gains, losses and risk.



Once the standard deviation of risk is calculated and graphed, the investor will want to directly compare the portfolio's returns and volatility using Sharpe and Sortino ratios. These industry standard formulas are used to determine the risk-adjusted performance of a portfolio. Sharpe and Sortino measure the amount of return that was generated per unit of risk, making it useful in comparing funds of different strategies. The ratios show whether a portfolio's return is due to good investment decisions or the result of excessive risk taking.

Since large positive returns will also cause an inflated standard deviation, the Sortino Ratio differentiates between good and bad volatility, providing a risk-adjusted measure of a fund's performance. As shown below, it does this without penalizing the fund for positive performance.



Simply stated, the higher the value of either ratio, the more return is generated per unit of risk. Therefore, a higher absolute return over the risk-free rate or a lower standard or downside deviation, will lead to a higher ratio. The ratios will show exactly what types of risks – good or bad – were taken to achieve that performance. By calculating these ratios, one might learn that a fund did not properly compensate the investor for risk or, worse, that the fund was simply levering market returns.

DRAWDOWN ANALYSIS

> *"Drawdown analysis is useful for investors to understand how long they might need to wait for their capital to recover in the event of loss."*

Drawdown analysis is another way of assessing risk by measuring the valley between peaks of monthly performance. As with averages, drawdown analysis is simple to understand and compare across peers, and provides investors with a feel for risk over the life of the fund. Investors will want to know both the number of months down and months up since inception, the best month, the worst month and most importantly the Max Drawdown. The Max Drawdown is the greatest observed amount of loss from equity high until a new equity high is reached. How much was the drawdown and what was the length of time to recovery? Drawdown analysis is useful for investors to understand how long they might need to wait for their capital to recover in the event of loss.

Many investors will also be interested in up and down capture ratios. These are a fund's cumulative return divided by the relevant index's cumulative return for up and down markets respectively. During up markets, the greater the value the better, whereas during down markets, the smaller the value the better. In an up market, a value over 100 would indicate that a manager has outperformed that index during the period. Simply stated, attractive managers perform better than the market when it is up and hold up better than the market when it is down. This metric is a simpler version of what we statistically analyze later in the regression analysis section.

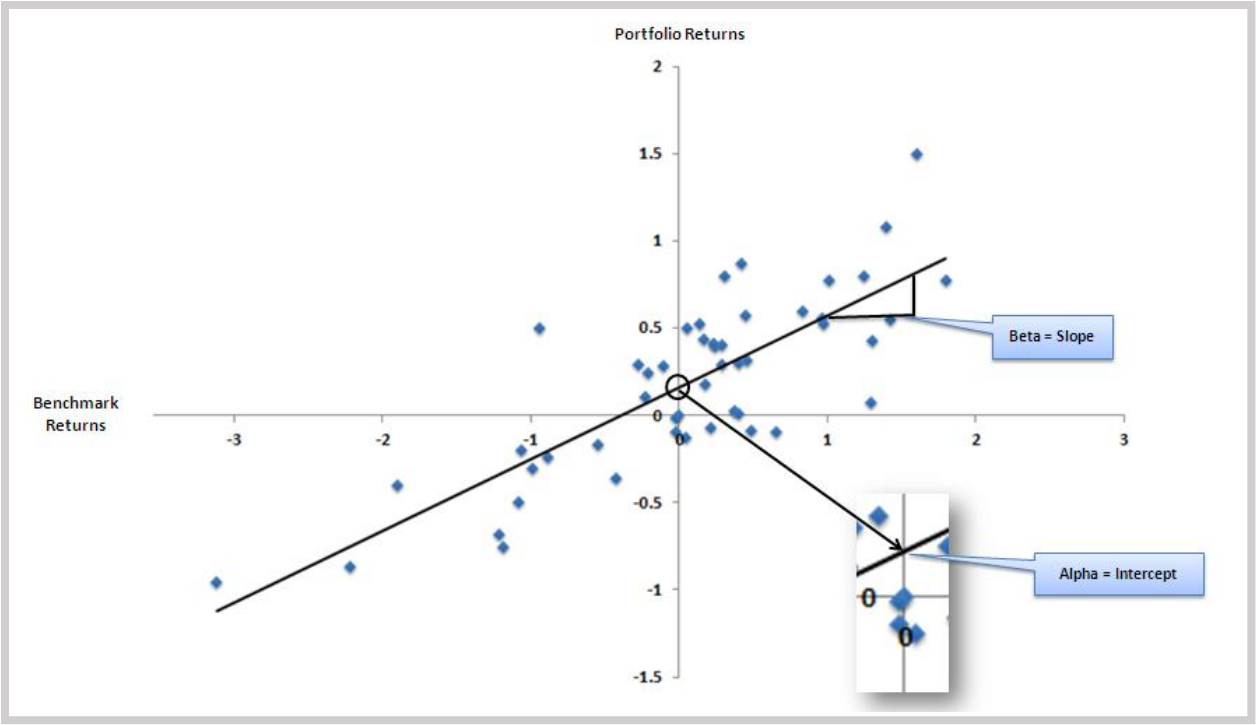
REGRESSION ANALYSIS

So far, this paper has looked at the components of risk in the portfolio alone. Similar to the performance discussion, the final step is to understand how the fund's risk levels compare to various benchmarks using regression statistics.

Regression analysis statistically compares the portfolio to a benchmark and yields metrics which help the investor better understand the manager's returns. Specifically, the regression model tells the investor how the portfolio will perform given a known market return. This allows the investor to verify that the fund has correctly categorized itself as part of a certain index or strategy

and also understand if the fund fits within its overall investment objectives. The main components of regression analysis are Beta, Alpha, R-Squared and Correlation. All the concepts work together to give the investor a perspective on the fund relative to the benchmark.

Below is a visual representation of regression. The data is plotted with portfolio and benchmark returns on the X and Y axis with each point corresponding to both observed returns at that point in time.



Beta is the most evident output of the plot, the steeper the line the higher the Beta. The Beta is used to predict what the portfolio return will be, given a known return in the benchmark. The steeper the line gets, the more the portfolio is predicted to move when the index moves. The line is therefore describing the portfolio's volatility. A Beta of 1 suggests a portfolio that equals fund/market volatility.

Next, we add in the Alpha. Alpha is commonly thought of as return over the benchmark. This, however, is incorrect as it ignores the Beta or relative volatility to the market benchmark. Alpha, shown above, predicts what the portfolio will do if the index return is 0, meaning the amount of return not explained by market risk (Beta). A positive regression Alpha means the fund has outperformed compared to the benchmark, whereas a negative regression Alpha means it has underperformed. In other words, Alpha measures the value a manager adds to or subtracts from a fund's performance relative to the market.

Adding in the R-Squared tells the investor how much of the variation in the portfolio's returns is explained by variation in the index. How well does the regression line fit the data? If the R-Squared is high, close to one, then it is a good fit regression line and the Alpha and Beta points are relevant. If the R-Squared is low, close to zero, then the Alpha and Beta are irrelevant because it is not a good regression line.

Finally Correlation also measures the strength of the relationship and specifically the linear relationship between the index and the portfolio. The values range from -1 to 1. A value of 1 (-1) means that the two have a perfect (inverse) linear relationship. A 1% change in value for the portfolio would be observed with a 1% change in the index. For example, a fund that is long the basket which comprises the index exactly, would have a Correlation of 1, if it was short then the Correlation would be -1. Correlations are helpful for investors because they tell them if managers had tailwinds that led to their outperformance.

OVERLAY 3: ATTRIBUTION ANALYSIS

The due diligence process starts by giving investors a snapshot of a fund's performance, while the second step is to analyze risk. The third is to show investors exactly from where managers are producing their returns. This leads us to a discussion about attribution. To have a complete picture it is necessary to conduct both absolute and relative attribution analysis.

Absolute attribution disaggregates the returns into their respective components. The traditional categories stop with attribution by long and short, but sophisticated investors may require the following categories:

- Attribution by sector
- Attribution by analyst or manager
- Attribution from stock selection
- Attribution by market capitalization
- Attribution by liquidity

Relative Attribution is an industry-recognized method of analysis which helps a manager separate their returns into two categories: those created by the market compared to those resulting from active management. Investors want to see that it was the manager's decisions, as opposed to luck or leverage, that generated Alpha. In a popular attribution model, such as a Brinson-

based model, total return is broken down into performance of the portfolio versus performance of the benchmark. It explains how the manager's asset allocation and stock selection decisions contributed to the excess performance or underperformance relative to the benchmark. Below is a sample attribution analysis:

Standard Benchmark Attribution					
Sectors	**Portfolio Weighted Return**	**Benchmark Weighted Return**	**Asset Allocation**	**Stock Selection**	**Active Management**
Cash and Equivalents	-1.09	0.00	-1.32	0.00	-1.32
Financial Services	-1.45	2.11	-2.10	-1.74	-3.84
Technology	2.90	2.05	-1.20	2.39	1.19
Utilities	2.31	0.77	-0.47	2.34	1.87
Health Care	1.97	0.64	-0.49	2.26	1.77
Consumer Discretionary	8.57	3.25	0.87	5.11	5.98
Consumer Staples	1.15	1.35	-1.03	0.87	-0.16
Materials & Processing	1.48	1.06	-0.68	1.30	0.63
Producer Durables	10.42	2.93	3.97	4.29	8.26
Energy	-0.38	2.34	-2.47	-0.45	-2.92
Not Classified	-3.24	0.00	-3.62	0.00	-3.62
TOTAL	23.94	16.10	-8.53	16.37	7.85

Alpha?

Stock Picking or Sector Allocation?

The above table contains a great deal of information for the investor to evaluate. After identifying the components which comprised performance from the absolute attribution analysis, the investor can now see whether the returns were based on capital commitment to the categories identified (asset allocation above) or stock selection within each category. As with many metrics discussed, there is no perfect absolute attribution. The manager is using this as a tool to tell his story of where he put capital successfully and where he made superior asset selections within the portfolio.

The above tools are leveraged by managers to articulate their edge. They are also utilized by many managers retrospectively in evaluating their performance and that of their investments. Being able to demonstrate this effectively to investors will show a greater amount of control over the investment process and lead to enhanced investor confidence in the returns of the fund.

Absolute and relative attribution provide the final overlay of the due diligence process and show how the manager is adding value. This white paper has outlined a few of the more popular attribution techniques, but there are countless additional methods that we simply did not have the space to cover: outperformance adjusted by exposure, long/ short spread, attribution by largest winners and losers, etc. As we previously mentioned, the focus of this paper was not to write an exhaustive statistical analysis, but rather to review the most widely used due diligence techniques.

Portfolio Fit

The final step for investors will be to determine if, based upon their findings, an investment is warranted. Investors will look at the risk-adjusted return figures and run a correlation between the manager and the investor's existing portfolio. There are a whole host of good managers who do not receive allocations because they do not beat out the great managers already in the investor's portfolio. Today, it is not good enough to simply have positive performance, to be successful raising capital you must create a truly differentiated fund that consistently adds value.

CONCLUSION

The investment process is about trading risk for reward. The investor due diligence process, which once was simply an evaluation of a hedge fund manager's people, process and philosophy, has matured in line with the hedge fund industry so that today, these qualitative aspects have become only the first step of the full due diligence process.

This paper began with a review of the traditional metrics used by investors and concluded with a discussion of more advanced due diligence analytics. In looking at historical performance data, managers can no longer just review total return since inception, but must also provide data for customized date ranges. In discussing correlations, can managers find a better benchmark to analyze their results than the S&P 500 or Russell 2000? When providing a composition breakdown, reporting gross and net positions is not sufficient, full delta-adjusted exposures are also necessary. Attribution analysis does not stop at Alpha from long and short positions, but should be broken down by sector, analyst, stock selection, market capitalization and liquidity to form a true picture of returns. The due diligence process has evolved; make sure that you have the tools in place to meet the current demands of today's sophisticated investor.

It is critical to note that not all investors allocate only after the intense quantitative process we have outlined above. Fundamentally, the hedge fund industry is still a story about people. At its core, investors are looking for active management of their assets. Investors want to entrust their assets to someone they believe to be an expert with a differentiated process. There will never be a replacement to a good story and a firm handshake, but the due diligence process helps provide additional clarity to the investor's investment decision.

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