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TUTTLE TACTICAL MANAGEMENT
Proven Strategies... Better Solutions

Forward-Looking Due Diligence

Tuttle Tactical Management

Contents

Standard Due Diligence vs. Forward-Looking Due Diligence

Forward-looking due diligence philosophy consists of evaluating asset classes or the methodologies of portfolio managers to gauge how they may perform in the future. Although past performance is also reviewed, it is not looked at as an indication of future performance. Rather, it is used to get a sense of how the past performance was generated.

Conversely, standard (e.g., backward-looking) due diligence usually involves looking at past returns for an asset class or a portfolio manager and then sometimes mistakenly assumes that those returns will persist into the future. Some investors may consider more sophisticated factors such as Alpha, Sharpe Ratio,

Standard Due Diligence vs. Forward-Looking Due Diligence (cont.)

or Sortino Ratio to justify predicting future results. Modern Portfolio Theory also generally uses standard due diligence, assuming that past returns, volatility, and correlation will persist into the future.

Common sense dictates that the process is not as simple as backward-looking due diligence would suggest, which is why we are familiar with the common phrase, *"Past performance does not guarantee future results."*

Standard Due Diligence	Forward-Looking Due Diligence
Belief that most recent past will equal future performance	Past performance will not equal future performance
Seeks to create a false sense of certainty	Embraces uncertainty
Looks at past performance to project future possibilities	How did manager generate past performance AND what is the likelihood that it will persist into the future?
Focuses on verifying the continuation of the strategy	Seeks to determine how adaptive the manager/strategy is
Performance mentality	Results mentality

Forward-Looking Due Diligence: Process

In conducting forward-looking due diligence, you should generally start with assessing a track record, which can be based either on real performance or on backtested data.

Due Diligence of Individual Managers

This process starts with standard measurement systems, such as track record, correlation, and volatility. Then this is applied to a specific money manager, using four filters:

1 Return Attribution

From a reverse-engineering standpoint, where have any recent returns come from?

2 Attribution Persistency

How likely will the current performance persist going forward, and, if likely, why?

3 Tail Risk Analysis

What factors may contribute to potential loss?

4 Portfolio Flexibility

What changes in strategy, if any, would managers be willing to make?

Return Attribution

Forward-looking due diligence still looks at past returns, but the goal is to only assess where they came from. If they were good, why where they good? If they were bad, why were they bad?

Examples: If an investor is looking at a growth stock manager in 2000, their returns most likely came from investing in tech stocks, which had a large up move. If one is looking at bonds over the past 30 years, they benefited from a period of lowering interest rates. If one is looking at any equity manager in 2019, they have benefited from a bull market in stocks. Once an investor knows where past returns came from, they can consider Attribution Persistency.

Attribution Persistency

Attribution persistency asks the question, “What is the likelihood that returns will persist into the future?” This is one of the most difficult parts of the forward-looking due diligence process because one needs knowledge of how markets and different strategies work. A key component to any market is reversion to the mean. If you look at any asset class over large periods of time, it has an average return. When an asset class has major deviations from the long-term average, generally it will eventually revert back to the average. This means that an asset class that does substantially better than the average return will most likely experience eventual large losses to get back to the average. This is a potentially difficult concept for

many because while an asset class is deviating from the average, there may be a pervading thought that something is different now.

Example: Referring back to the growth manager in 2000, it is easy to see that tech stocks did so well from 1995-2000 that they are due for a major correction. Forward-looking due diligence can't tell you when the correction is going to happen (this is not market timing), but it can tell you that a correction may occur at some point.

Tail Risk Analysis

Tail risk analysis asks the question, "What can go horribly wrong?" Every asset class and investment strategy has its "Black Swan." This is the event that statistically should not happen but will happen at some point. For a portfolio manager, this is also the event that they typically can't prepare for or hedge. Before investing in an asset class with a portfolio manager, one generally needs to know what the worst-case scenario is. In some cases, this is a simple task (e.g., for a buy and hold equity manager, the tail risk is a bear market, which could produce losses of 60% or more). Other times, more advanced knowledge is required. Consider, for example, a manager who had generated a consistent track record selling naked options (i.e., selling options on securities they didn't own). Someone who understands this type of strategy will know that selling naked options could result in unlimited losses, which, in this example, is what happened to this particular manager when volatility spiked in February 2018. Bottom line: if investors don't understand an investment strategy enough to know what the worst-case scenario is, generally they should not be investing in it.

Portfolio Flexibility

Portfolio flexibility applies to portfolio managers. It asks the questions, "What changes will you make, if any, when market dynamics change? How adaptive can the manager and strategy be?" There are certain overriding aspects of market behavior that will never change: we will have bull markets, we will have bear markets, and markets will revert to the mean. However, the dynamics within the overriding aspects do change over time. For example, we still have bull and bear markets today, but markets move quicker than they ever have before. A strategy that worked in the past during slower markets may not work going forward in markets that move much more quickly. New product development can also result in changing market dynamics. A large part of the volatility spike in February 2018 was caused by the massive amount of money in inverse volatility products.

Unfortunately, many money managers don't have much flexibility. Once market dynamics change, they may try to convince clients that whatever is happening is an anomaly and eventually things will go back to normal. When managers adopt this mindset, there is generally some cause for concern.

Due Diligence of Aggregated Portfolios

When determining whether any changes are to be made to portfolios, additional questions may be asked pertaining to the aggregation of managers:

1 Performance vs. Expectations

How did portfolios of combined managers, for example, perform against expectations?

2 Portfolio Optimization

What changes in allocation percentages, if any, are required to improve portfolios?

3 Scenario Analysis

What are possible market scenarios going forward on an immediate basis? How would current portfolios perform in those markets?

4 Failure Mode and Effect Analysis

How would different variations of these managers perform against certain filters (e.g., MAR Ratio)?

Performance vs. Expectations

In general, a portfolio is not going to be perfect. There will typically be day-to-day, week-to-week, and month-to-month fluctuations. It is important to evaluate a portfolio against expectations. This could occur intraday, daily, weekly, or monthly. If a portfolio is deviating from what one would expect, a manager needs to figure out why. Once this is determined, one can ask whether there is a potential problem. Have market dynamics changed? Is a manager or asset class doing something unexpected?

Portfolio Optimization

If there is a hole in a portfolio, then portfolio optimization will attempt to address and plug it. If market dynamics have changed and there are money managers who are not shifting with it, these managers may need to be replaced. An overriding factor in portfolio optimization is to help ensure that if one hole in a portfolio is plugged, another hole doesn't result. For example, consider a countertrend money manager who would protect a portfolio in a choppy market but who struggles to do well in a straight up market. Taking them out of the portfolio might help performance in a straight up market, but now there may be a problem when the market turns choppy.

Scenario Analysis

Scenario analysis focuses on constantly asking, "What are the potential scenarios that could happen with the market, including the Black Swans, and how would a portfolio handle them?" This feeds back into portfolio optimization, as it may help identify potential holes in a portfolio.

Failure Mode and Effect Analysis

Ideally, each part of a portfolio should be working in harmony in the attempt to generate gains in up markets and protect from losses in down markets. So an issue in one part of a portfolio can have a large impact across the portfolio. If there is a countertrend manager who is supposed to offer protection from a choppy market but is struggling, then the portfolio might struggle in a choppy market. If there is a momentum manager who has decided to use leverage, that can substantially change a performance vs. expectations. Failure mode and effect analysis is about constantly monitoring the portfolio mix to determine any ripple effects from one part of the portfolio to the others.

Evaluating Backtested Returns

While reviewing backtested results for an investment strategy is a routine process for many investors, it is important to stress-test this data against several screens in the attempt to eliminate factors such as confirmation bias. These screens include curve fitting, walk-forward testing, data mining, and time dilation.

Curve Fitting and Walk-Forward Testing

For every set of price data there may be an ideal set of parameters that would have generated outstanding results in the past. Curve fitting is the process of finding this "magic" set of parameters and assuming they will persist into the future.

It is extremely important not to get fooled by curve-fitted backtests. Stocks have been in a bull market since March 2009, so any stock market backtest will look good. Similarly, bonds have been in a bull market for 30 years, so any backtest on them will look good as well.

There are two main ways that a backtest could be curve fit, the first by optimizing across the entire data set to find the best parameters and then assuming those parameters will be the best going forward. The second way involves managers using their knowledge of what happened in the past in their backtests. Most backtest systems try to find the best set of parameters over the entire data set and then assume that those parameters will continue to be the best. In general, however, this assumption rarely plays out during live trading.

To minimize the chance of curve fitting, a manager can use walk-forward testing. For example, assume you are going to test a moving average crossing system over 20 years of data. The curve-fit approach would be to take the entire 20 years of data and find the best moving average. Conversely, an approach using walk-forward testing would split the 20 years of data between in-sample and out-of-sample data. In-sample data would be used for the optimization, which is then tested on the out-of-sample data. So one might optimize the first three years of data to find the best moving average and then test it on the next three years of data. This process can be continued forward to help determine if a strategy is robust. In the traditional approach of backtesting, the out-of-sample data becomes live results, and if the parameters are not robust, one may see real monetary losses (vs. negative results in a safe test environment).

Another way to minimize the chances of curve fitting is to look at the distribution of parameters. The parameters around the best set of parameters should be good also. For example, if the 200 day moving average is the best set of parameters for a moving average crossing system, then 190 days and 210 days should be good also. If they are not, then the results may have undergone curve-fitting.

Using knowledge of what happened in the past for a backtest is also potentially dangerous. This usually results in the assets that have had the largest up moves being included in models. These are also typically the assets that have the largest corrections.

In summary, when evaluating a backtest, it may be beneficial to keep these three things in mind to ensure the backtest isn't curve fit:

1. Utilize walk-forward testing.
2. Make sure that the security basket isn't just the stocks or asset classes that have done the best.
3. Make sure there are enough trades to eliminate luck as much as possible.

Data Mining

Data mining involves analyzing available data for patterns or correlations, which may erroneously suggest a potential strategy is valid. There are certain market dynamics and anomalies that traders can take advantage of, and then there are coincidences. The potential danger of data mining is that it will find the coincidence.

To avoid data mining, a backtest always needs to start with a premise, which is then proven or disproven. If the backtesting system finds something in the market that it can't explain, then it is probably data mining. What one is looking for is whether a manager did the work to ensure they weren't data mining or whether they stopped on something that looked good but didn't pass the data mining test.

Time Dilation

Time dilation is part of the human condition in that people may tend to feel that the immediate past or present will persist into the future. This tends to give people a distorted image of what will transpire going forward. This can also result in people entering and exiting markets at the wrong time.

We can handle time dilation by acknowledging that drawdowns happen while also helping to ensure they are shallow and do not last long. Still, while a downturn in a strategy might be brief in relation to the broader investment timeline, the investor may consider the downturn as a significant event, one that has an uncertain end. This is important in that one could develop a backtest that has an average annual return of 20% over 10 years with the occasional down 10% month. Over a 10-year period, what happens in one month may be insignificant, but for the investor who is down 10% it does not feel insignificant.

To avoid this, the backtest system needs to look at the risk results of the backtest: maximum drawdown, worst month, trade by trade distribution, average trade, average win, average loss, etc. Often a backtest will have strong enough returns that filters can be added that can reduce risk while still keeping returns above whatever benchmark the backtest system is looking to beat.

Additional Applications

While the forward-looking due diligence process was originally designed to assess the methodologies of portfolio managers and evaluate asset classes, there are many additional applications due to the methodical nature of the process. Consider, for example, the potential benefits of applying such a process to areas of your personal and professional life:

- ☐ Developing professional alliances
- ☐ Maintaining healthy relationships
- ☐ Expanding one's business
- ☐ Creating and sustaining new habits
- ☐ Coaching one's peers

Use the worksheets on the following pages to help you apply forward-looking due diligence to your own life.

Worksheets

Focus Area: Assessing Professional Alliances

Phase I: Reflection on Past Alliances	Your Assessment
1. How would you characterize successful professional alliances you have had or witnessed in the past?	
2. How would you characterize past alliances that, in your opinion, did not work successfully?	
3. In what ways have past alliances started shaky only to evolve into effective partnerships?	
4. Conversely, in what ways have past alliances started strong only to eventually fall apart?	

Phase 2: Reflection on Current Alliances	Your Assessment
1. If a current or developing alliance is effectively established, what qualities or factors will help to ensure its continued success?	
2. What coaching or mindfulness resources and concepts have been applied that may help foster a healthy alliance?	

Phase 3: Assessing Risk & Worst-Case Scenarios	Your Assessment
1. What are some potential risks with developing, maintaining, or dissolving a particular alliance?	
2. What are the risks associated with making changes (or not making changes) to a particular alliance?	

Phase 4: Flexibility	Your Assessment
1. What changes are you willing to make in order to develop or improve an alliance?	
2. What are the potential ripple effects (positive and/or negative) of implementing any potential changes in how you manage an alliance?	

Worksheets (cont.)

Focus Area: Maintaining Healthy Personal Relationships

Phase I: Reflection on Past Relationships	Your Assessment
1. How would you characterize healthy relationships you have had or witnessed in the past?	
2. How would you characterize past relationships that, in your opinion, did not function in a healthy manner?	
3. In what ways have past relationships started shaky only to evolve into effective ones?	
4. Conversely, in what ways have past relationships started strong only to eventually fall apart?	

Phase 2: Reflection on Current Relationships	Your Assessment
1. If a current or developing relationship is effectively established, what qualities or factors will help to ensure that it continues in a healthy manner?	
2. What coaching or mindfulness resources and concepts have been applied that may help foster a healthy relationship?	

Phase 3: Assessing Risk & Worst-Case Scenarios	Your Assessment
1. What are some potential risks with developing, maintaining, or dissolving a particular relationship?	
2. What are the risks associated with making changes (or not making changes) to a particular relationship?	

Phase 4: Flexibility	Your Assessment
1. What changes are you willing to make in order to develop or improve a relationship?	
2. What are the potential ripple effects (positive and/or negative) of implementing any potential changes in how you foster a relationship?	

Worksheets (cont.)

Focus Area: Expanding Your Business

Phase I: Reflection on Business History	Your Assessment
1. How would you characterize the positive ways in which your business has handled growth in the past?	
2. How would you characterize the negative ways in which your business has handled growth in the past?	
3. What practices have you implemented in the last year that have positively and/or negatively affected your business?	

Phase 2: Reflection on Current Business Practices	Your Assessment
1. What practices have you implemented in the past that are likely to persist during a potential expansion?	
2. Of these practices, which are likely to come under strain (or cause strain)?	

Phase 3: Assessing Risk & Worst-Case Scenarios	Your Assessment
1. What are potential worst-case scenarios of expanding your business given your current practices?	
2. What are potential worst-case scenarios of NOT expanding your business given your current practices?	

Phase 4: Flexibility	Your Assessment
1. What changes are you willing to make in order to help ensure a successful business expansion?	
2. What are the potential ripple effects (positive and/or negative) of implementing any potential changes in how you expand your business?	

Worksheets (cont.)

Focus Area: Creating and Sustaining New Habits

Phase I: Reflection on Past Habits	Your Assessment
1. How would you characterize the positive ways in which you created and sustained new habits in the past?	
2. How would you characterize the negative ways in which you created and sustained new habits in the past?	
3. What practices/changes have you implemented in the last year that have primed you for creating and sustaining a new habit?	

Phase 2: Reflection on Current Habit Formation	Your Assessment
1. What practices/changes have you implemented in the past that are likely to persist and become fortified as you continue to form new healthy habits?	
2. What practices/changes have you implemented in the past that may come under strain as you continue to form new healthy habits?	

Phase 3: Assessing Risk & Worst-Case Scenarios	Your Assessment
1. What are the risks associated with NOT moving forward with developing a particular new habit?	
2. What about this particular new habit will be the most difficult to achieve?	

Phase 4: Flexibility	Your Assessment
1. What changes are you willing to make in order to help ensure that you can create and sustain a new habit?	
2. What are the potential ripple effects (positive and/or negative) of implementing any potential changes in how you create and sustain a new habit?	

Worksheets (cont.)

Focus Area: Coaching Your Peers

Phase I: Reflection on Past Coaching Mindset	Your Assessment
1. Identify the ways in which your previous attempts at coaching or instructing resulted in a positive experience.	
2. Identify the ways in which your previous attempts at coaching or instructing resulted in a negative experience.	
3. What practices/changes have you implemented in the last year that have primed you for coaching your peers?	

Phase 2: Reflection on Current Coaching Mindset	Your Assessment
1. What practices/changes have you implemented in the past that are likely to persist as you coach and instruct others?	
2. What practices/changes have you implemented in the past that may need further development as you prepare to coach and instruct others?	

Phase 3: Assessing Risk & Worst-Case Scenarios	Your Assessment
1. What are the risks associated with relying on previous coaching mindsets/strategies?	

Phase 4: Flexibility	Your Assessment
1. What changes are you willing to make in order to further develop a coaching-centric mindset?	
2. What are the potential ripple effects (positive and/or negative) of implementing any potential changes in how you develop a coaching-centric mindset?	