The Many Dimensions of Risk Management

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The Range of Issues

- Risk management is simultaneously both a bottom up and a top down process.
- At the bottom, it is the control of individual trade risk, where no one asset can exceed certain risk limits,
- At the top, it is the control of portfolio volatility and the ability to define risk expectations.
- In between, it is necessary to continually balance risks so that no set of assets dominate the performance, either good or bad.
- We always need to look for what is missing.
  - A run of very good low-volatility performance without risk (as with Long Term Capital Management), or a short-term run of profits with high volatility.
  - Letting the “good times roll” is not always sound risk management.
Basic Portfolio Concepts

• We should be concerned with balancing risk rather than balancing expected returns.
  o Balancing risk is the first step to maximizing diversification – if you control the risk of assets that have a history of positive returns, you will thrive.

• Simple tools for measuring risk are most often better than more complex ones
  o They are easier to understand and to work with
  o The markets are always changing, so that there is always a large degree of uncertainty no matter what measurement tools you use.

• Equal weighting wherever possible is always the safest approach
  o If you put more risk on any one asset then you must get a higher payout for that asset. Those predictions are not usually reliable.

• Volatility stabilization, varying portfolio leverage to maintain constant risk, is a good, long-term policy
Diversification

• In theory, adding any asset with similar returns improves diversification (measured by the information ratio).

• In reality, diversification works except during a crisis, when it’s needed the most.
  o Money moves the market. In a crisis everyone liquidates, so that all longs go down and shorts go up.
  o Liquidation causes contagion. Unrelated assets move together.
  o Deleveraging or hedging are the only way to reduce risk.
  o Market neutral strategies may be immune from these events, but not always.
Money moves the market
(correlations are more extreme when you view it as the returns of a macrotrend system)
More diversification qualifiers

• For most investors, diversifying into more than 4 “uncorrelated” assets is a case of diminishing returns.

• Extreme diversification, except to gain liquidity, can be counterproductive. It often means adding the marginal return. The ability to remove the consistent under-performers from a portfolio can greatly improve net returns.
Tools for Measuring Risk

- **Annualized volatility**
  - The basic tool used by the financial industry
  - Uses the standard deviation of daily returns, annualized
  - Historic volatility is usually more dependable than implied volatility
  - As a trader, entering trades when volatility is greater than 40% presents more risk than reward

- **Value-at-Risk (VaR)**
  - A measure of how risky your current position would have been if you had held it for the past 6, 12, or 24 months.
  - A good way of assessing today's risk, but dependent on your selected historic price period, so of limited accuracy.
  - Even so, reducing risk when it shows that there is a 5% chance of a loss greater than 3% or 4% today (or some longer period), will normally reduce your risk more than it reduces your returns.

- **Price noise**
  - A macro tool for determining which strategies work best in specific markets.
  - Markets with low noise are trending, markets with high noise are mean reverting.
  - We measure “noise” as net change divided by sum of absolute changes
Evolution of North America market usage – noise increases as markets mature, strategies change from trending to mean reversion
Evolution of world markets by region (both direction and absolute level are important)
Maturity of Asian markets
Emerging markets begin as very trending
Bottom up – early decisions

• Understand the risk of each trade or position
• Average in to a position to improve stability
  o Entering all at once can give you the best or the worst price
  o Averaging in using 3 or 4 parts, spaced out with regard to the expected holding period is much safer
  o The hidden advantage comes in short to medium term holding periods where the position is reversed before the initial position is completely filled.
• Use equal risk at all levels of trade and portfolio allocation
  o Subject to liquidity constraints
  o Equal risk maximizes diversification (volatility parity, 1 sided equities, 2 sided futures)
  o If you put more risk on any one asset, that asset must return proportionately more. I can’t predict that.
• Diversification into conceptually different strategies is more important than diversification into different markets
  o Crises causes price correlations to go to 1.0
  o A mean reversion and trend strategy will always be uncorrelated. Seasonality (and non-seasonality), merger arb, market neutral, and trend-bases systems can offer sustained diversification.
Top down

- Volatility stabilization – avoid scaring anyone – avoid underperforming
  - Monitor portfolio volatility and increase or decrease leverage to maintain a “target volatility,” which could range from 6% to 14% annualized, depending on risk preference.
  - Reducing volatility at high levels is similar to taking profits (when returns have been positive). Riding the returns up usually means riding them down.
  - Increasing volatility during quiet periods is very important to maintain expected returns. Most periods of good returns have low volatility. Without increasing leverage you won’t meet your goals.
  - Be careful to avoid distorting the risk of individual assets relative to the portfolio. Some assets can’t be leverage up but they can be leveraged down or hedged. One side of volatility stabilization is better than none.
  - Always try to leverage up or down equally across the portfolio to maintain diversification.
The risk in the middle – forgotten territory

• Pay attention to the varying risk of each asset
  o Volatility of individual assets can vary considerably
  o Each asset must be volatility stabilized to the same target level in order to have a risk-adjusted portfolio.

• Some portfolio managers prefer to let an asset “run.” That is, if it’s making money and the volatility is increasing, then let it continue that way.
  o That may increase returns in the short-term, and sometimes in the long-term, but it will show a large increase in your portfolio risk.
  o Investors may consider these increases in risk as inconsistent with the concept of conservative management.
  o Once you have posted high risk, it can’t be erased.
Removing high volatility

- If we look at our chart of price volatility, we see that 2001 and 2008 were very volatile
  - Annualized vol = \( \text{stdev(20-days of daily returns)} \times \sqrt{252} \)

- High volatility, especially extreme volatility, produces very high risk.
  - In arbitrage, two assets can become disengaged (PFE and NVS)

- In most cases, markets with annualized volatility > 50% should be omitted or exited.
High volatility varies from market to market except during a crisis.
Net returns with and without a high volatility filter
Accepting the upwards bias in equities

• Equities have a clear upwards bias
  o Price tend to have longer, slow upwards movements and fast, short downward bursts (with the occasional exception)

• It is very difficult to capture profits on the short side of equities
  o Strategies must react faster and have smaller objectives
  o Many investments are barred from short sales
  o Macrotrend strategies are too slow
  o For equities, it is generally safer to be long-only

• Futures offer a realistic alternative for “crisis alpha”
  o The best futures strategies over the past 40 years have been macrotrends.
  o Since 2000, these programs have had frustrating, sideways performance that lasts years
  o But during 2008 they returned 50% on a highly leveraged portfolio that would have offset most of the losses in equities. This is called “crisis alpha,” the ability to perform under stress.
  o Futures can profit on the short side of equities because of leverage.
Upward bias even in arbitrage

Taking only the long legs for AMZN-WMT, ignore the shorts

Taking only the short legs for AMZN-WMT, ignore the longs
Hedging long-term equity positions can reduce volatility

• Hedge equity positions usually loses money, but it is needed for the extreme cases, such as 2008.
• We don’t know the right time period for the hedge, so we use 30, 60, and 120 day moving averages, equally weighted. The Yum! example uses 40 days.
• With 3 trends, we can hedge 1/6 on each downturn, intending to only protect 50% of the risk. So a potential loss of 40% in 2008 could be reduced to a loss of 20%.
• We hope that the hedge loses money so that we profit on the long position in the stock.
Hedging equity risk using an index – losses are normal but insurance is necessary
Summary
Risk management has many components

- Favor equal risk at every level of operation
- Seek uncorrelated strategies
- Apply the right markets to the appropriate strategies
- Try to eliminate the marginal winners
- Watch for upward bias
- Avoid high volatility
- Use volatility stabilization to avoid high risk and underperformance
- Be prepared to hedge part of your equity exposure as prices turn down
Reading suggestions

- “The Logic of Failure” by Dietrich Dörner
- “Inside the Black Box” by Rishi Narang (the section on portfolios)
- “The Black Swan” by Nassim Taleb (only the title)
Questions or Comments?

For more detail on trading techniques, refer to *Trading Systems and Methods, Fifth Edition* (John Wiley & Sons), by Perry J Kaufman


We would be happy to hear from you and answer any questions you might have

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