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Reprint from November 2011

## Low Volatility Portfolio Tools for Investors

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### Introduction

The world is a volatile place. The headlines this week are completely different than headlines a month, or a quarter, or especially a year ago. The changing economy and turbulent world events compound the risk and uncertainty in the marketplace and make the asset management problem for investors far more complicated than those facing shorter-term traders. Traders are often able to get into and out of the market while the general economy is unchanged; investors may hold their portfolios over several changing economic regimes.

Most financial planners, and their clients, follow “investment” rather than “trading” strategies. By this, most financial planners do not buy and sell from their portfolios intraday, daily, or even weekly. Financial planners generally are more concerned with making a fair return and avoiding loss with significantly longer holding periods than are those pursuing short-term trading strategies. However, it is our observation that most “investment management” texts focus on risk assessment and management tools appropriate for traders and give little attention to tools appropriate just for longer term investors. Similarly, most of the widely marketed “investment research” tools are designed for traders rather than investors.

This tutorial presents an overview of five types of risk assessment and management tools especially appropriate for investors. They are market risk, sentiment risk, intrinsic value risk, attribution instability risk, and residual risk (like “value-at-risk”). (A more detailed discussion of these is available in MacroRisk Analytics Working Paper 2011-J.) Afterwards, a simple example is presented to show how controlling these types of risk can improve portfolios.



Volume IX, Issue 11, November  
2011

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## Five Types of Risk

To begin, consider market risk. Market risk is probably the most common type of risk discussed by investors and traders. Undoubtedly the most common measurement of market risk is the ubiquitous “CAPM beta.” Betas are available from numerous vendors and services and are often interpreted as the expected change in an asset’s return given a change in the overall market’s return. However, numerous authors (e.g., Chong and Phillips, 2011a) have demonstrated that there are often at least two separate relations between an asset and the market, one holding when the market is going up and a different one when the market is going down. That is, the beta is different when the market is going up than when the market is going down. For risk management, it is the beta for when the market is going down that especially matters. For most financial planners and their clients, risk is related to the chance of losing money rather than the chance of an unexpected windfall; risk is generally a bad thing and unexpected windfalls are generally good things. Consequently, we propose that financial planners use the downside beta rather than the traditional CAPM beta that most vendors provide. Downside beta reflects how the asset (or portfolio) relates to the overall market on days when the market goes down in value. We tend to use a maximum downside beta value of 0.7 as a threshold for including an asset on a buylist.

Sentiment risk, also known as momentum, is brought about by behavioral reasons or unusual factors influencing the marketplace. Sometimes, perhaps for no particular reason, a fund, stock, industry, or sector becomes very popular and its market price commands a premium. Other times, there may be a discount as the asset falls out of favor with the marketplace. We use the George and Hwang (2004) ratio of the current asset value to its 52-week high value as a momentum or sentiment measure. This is a fairly easily calculated ratio and ranges between 0 and 1. (Note that the ratio can never be greater than 1 because any new high value becomes the new 52-week high.) There is significant evidence that investments near their 52-week high tend to continue near their high. We propose using a filter value of 85% as a minimum value for the price to high price ratio; assets that are not valued at 85% or more of their 52-week high would be excluded from the buylist.

The first two risk factors can apply equally well to short-horizon traders and to long-horizon investors. The next three are primarily applicable just to long-horizon investors.

Intrinsic value risk covers the potential decline in the intrinsic value of the portfolio assets. This is a key component of loan underwriting, real estate investing and asset management for many venture capital and private equity funds. It is also a major source of risk for longer term investors. Over a typical holding period, whether it is a quarter, a year, or much longer, there will likely be several shocking headlines about social or economic news that will cause volatile fluctuations in the marketplace. However, think about a pebble tossed in the ocean causing ripples that may be seen for a while, but eventually being overwhelmed by power of the tide. Similarly, many short-term ripples in asset values, whether “trading noise” or “sentiment change,” can have some impact on observed

asset values but over time, like the tide, changes in intrinsic value will prevail. Over time, markets are reasonably efficient and prices tend to average around their associated intrinsic value but as the intrinsic value changes, the stock prices will eventually catch up. The investor's challenge is to identify the risks to intrinsic value and assess their importance.

One approach is the Eta® profile and the associated Composite MacroRisk Index (CMRI). The details of this are presented in Chong and Phillips (2011b). This approach uses a statistical model to relate a common set of 18 economic variables, called MacroRisk Factors, to the asset prices. These MacroRisk Factors account for most of the observed fluctuation over time in asset prices. (At this writing, the 18 factors explained over 95% of the price variance for over 19,000 of approximately 22,000 assets analyzed.) The CMRI can be used as a filter to avoid investing in assets with excessive exposure to the economy. We propose using a value of 350, about twice that of the average Dow 30 stock and about three times that of the S&P 500 index. (Currently, only about 5% of the 22,000 assets we analyzed have CMRI values greater than 350.)

The fourth type of risk focuses on the style consistency of the investment. Attribution analysis, which can be performed in numerous ways, is a key component of investment analysis for pensions, large trusts, and institutional investors. Attribution risk reflects the potential inconsistency of the attribution analysis over time. For financial planners, consider investing a large portion of a client's holdings into a large cap value fund. Imagine, if a few months later, the fund announced that it was now going to focus on investing in European sovereign debt. Then, suppose the fund redirected its assets into REITs. While it's conceivable that any of those could be a viable basis for a mutual fund, they are all quite different. The changing attributions generate a risk for longer term investors that the assets purchased at the beginning of the holding period might be quite different at the end.

In the MacroRisk Analytics system, the R-squared of the Eta equation is used to measure attribution stability and (1 minus the R-squared) quantifies attribution risk. (This application introduces a different, but equally correct, interpretation of the 18-factor Eta equation; the intrinsic value equation is also an economic attribution equation). We propose leaving off the buylist any assets with an R-squared less than 95%. At this writing, that would exclude approximately 10% of the assets we analyzed.

The final type of risk is residual risk, risk that can be quantified but which isn't able to be associated with the overall market, investor sentiment, economic factors, or attribution risk. In other words, residual risk is the risk that remains when other factors are accounted for. Residual risk is an important concept in institutional finance, playing a key role in defining required capital levels for banks under the Basel II and proposed Basel III regulations. Consequently, residual risk in finance is often computed in terms of a value-at-risk—what percentage of asset value would be lost if a statistically infrequent event happened. MacroRisk computes its residual risk measure that way as well.

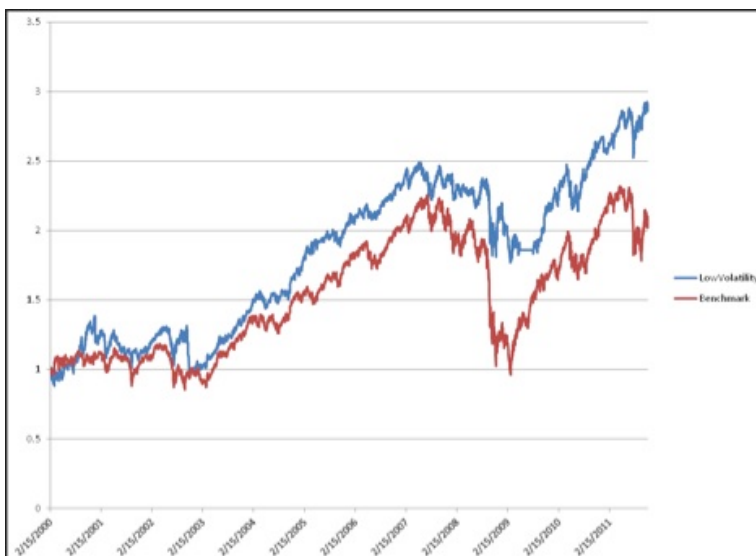
What does residual risk mean for financial planners? By using these advanced methods, it provides a way to get better control on what is sometimes called “unsystematic risk.” We propose excluding any asset with a residual risk index greater than 20. That is, if the statistics say that there is a 5% chance of losing greater than 20% of the asset value—quite apart from any of the other risks mentioned above—then we propose not considering the asset for client portfolios.

### **An Application: Creating Low Volatility Portfolios**

As a final point, consider the following demonstration which illustrates with common stocks how controlling these screens can generate better performing portfolios. (The methods apply just as easily to asset allocation modeling, mutual fund and wrap account portfolios, ETF portfolios, and hybrid portfolios.)

Using buylists of available S&P 500 stocks for each year from 2000 through 2011, the five filters were applied and the resulting stocks were formed into equally weighted portfolios. The portfolio was created as of 2/15/2000, initially rebalanced on 5/15/2000, and then every three months afterwards with the final rebalance happening on 11/15/2011. These portfolios are referred to as the “low volatility” portfolios in the discussion below. At each quarter, equally weighted portfolios of the entire buylist were also created for comparison purposes and will be referred to as “benchmark portfolios.” (Over this long a period, there is the potential for survivorship bias were the results compared directly to the reported S&P index; that is, since some of the companies in the index are no longer traded, they aren’t available now for analysis. By comparing the low volatility portfolios to equally weighted portfolios created from the buylists, there is no survivorship bias in the differential returns).

During this 12-year period, the “low volatility” portfolio had higher returns in 39 quarters and the unfiltered “benchmark portfolios” had higher returns in 9 quarters. The low volatility portfolio averaged 319 basis points (3.19%) per year higher return and over the entire period had a standard deviation (and also lower semideviation) of returns that was almost less than the benchmark’s. A plot of these two equally weighted portfolios is shown below.



Other examples are shown in Chong, Jennings, and Phillips (2011), including the improvement that comes from optimizing portfolios to reduce the overall CMRI, resulting in a “minimum Black Swan risk” portfolio.

## Conclusion

Most financial planners are investors, not traders, and consequently they need to use different analytical methods than traders. Whether financial planners design their own portfolios or use externally managed accounts, it is important to know how these five risks impact their portfolios and to control them to reduce overall volatility. This control may be through the use of filters, through the use of optimization aimed at risk reduction, or through a combination of the two approaches. By reducing portfolio volatility and exposure to the economy, the impact of the daily headlines on portfolios is minimized so it won't matter nearly so much what current economic disaster causes anxiety on Wall Street. But, whatever it is, you'll be prepared for the long term.

MacroRisk Analytics provides powerful cloud-based tools to help financial planners and investment professionals address each of the issues discussed here. For further information please contact Phil Hahn, Director of Marketing, at 888.502.3605 or [info@macrorisk.com](mailto:info@macrorisk.com).

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