PZENA INVESTMENT MANAGEMENT

Assessing Risk and Return

July 2011

Volatility reduction has been the hottest topic among investment committees since the global financial crisis. In an effort to avoid the experience of the last decade, equity exposure has been reduced, with fixed income and alternative asset classes receiving increased portfolio allocations. We have closely examined this issue, and propose that the true risk to a long-term investor is impairment of capital, not short-term volatility, and that widely used alternatives to equities – bonds, commodities, and hedge funds – are notoriously poor choices if the goal is to minimize the probability and size of real losses over the long term. With the proper framework for measuring risk and the proper duration of the measurement period, it may even be possible to earn superior returns while mitigating the true risk of permanent impairment of capital.

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Pzena Investment Management White Paper

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The ten years ending February 2009 were the most negative for equity investing in modern history, even surpassing the Great Depression, with the not surprising result that investors have now become extremely sensitive to risk and stock price volatility. In this article we address what we believe to be the real risks of long term investing and provide a framework for managing those attendant risks. With the proper framework for measuring risk and the proper duration of the measurement period, it may even be possible to earn superior returns while mitigating the true risk of permanent impairment of capital.

A Painful Ten Years

Portfolios have been rocked by the bursting of two bubbles over the last ten years: first, the dot.com boom/bust at the beginning of the decade followed, at the end of the decade, by housing. Their combined effects, along with the robust valuations in 1999 at the beginning of the measurement period, resulted in negative real returns for equities that far exceeded those of the Great Depression:

S&P Ten-Year Returns*

	Real	Nominal
March 1999 - February 2009	-45.7%	-30.0%
August 1929 - July 1939	-16.4%	-33.3%

Source: Robert Shiller (http://www.econ.yale.edu/~shiller/data.htm), Pzena Estimates
*Total return, including dividends, adjusted for change in the CPI.

Although the trailing ten-year real return for the S&P 500 had once again turned positive by March 2011 as the economy mended, the 1999-2009 experience left an indelible mark on the psyche of investors.

The Focus on Volatility

In an attempt to avoid a repeat of this experience, investors and consultants have turned to widely accepted tools to reconstitute portfolios in a manner that shields them from large short-term price swings that were prevalent during these periods. These tools include measures of risk and return, such as the Sharpe ratio, which compare a strategy's long-term excess returns to its short-term volatility. The investment community has long equated volatility with risk, and this belief has become pervasive and controlling. Consequently, equities have seen their role in portfolios reduced, while fixed income and alternative asset classes (e.g., hedge funds) uncorrelated with equity markets gain share.

All this begs the question: in focusing on short-term volatility as the primary measure of risk, are investors missing the bigger picture of what really constitutes risk over the long term? And is this focus on short-term volatility pushing investors into lower return asset classes without meaningfully reducing the true risk?

Methodology

To answer these questions, we must first focus on two central elements in the analysis: how to define risk in the context of the long-term investor, and what is the appropriate timeframe over which to evaluate risk.

Timeframe

First, let's address the issue of timeframe.

Short-term price movements matter for traders – they are closing out positions over a matter of days, if not hours. So a measurement of the probability or magnitude of loss that is of a short duration makes sense. But institutions are presumably investing for the long haul. Manager performance is typically measured over years, and manager changes are typically made infrequently. By observing the behavior of investment committees, one thing is clear – asset allocation changes are infrequent and modest when they do happen. Changes to investment managers likewise happen after only much time has elapsed. Using Pzena internal data, we would suggest that the average duration of an institutional account may exceed ten years.

So why don't we use a similar period for assessing the variability of returns and the real risk of losing money? If an investment policy is reviewed every ten years, shouldn't the proper timeframe for assessing risk be over a similar period?

Taking the long view presents a significantly different picture when evaluating the risks of equity investing. Using monthly data, we can measure the returns to the equity markets over different holding periods and see how the timing affects the results. The following chart presents volatility and the probability of loss for equities over holding periods varying from one month to ten years, evaluated over a 140 year historical period.

Equity Market Risk Diminishes as Holding Period Increases
1871 - 2011

	Standard Deviation of Returns Annualized	Probability of Loss* Real	Nominal
Monthly Holding Periods	14.3%	40%	38%
Annual Holding Periods	19.6%	32%	29%
Five-Year Holding Periods	8.1%	20%	11%
Ten-Year Holding Periods	5.1%	12%	3%

Source: Robert Shiller (http://www.econ.yale.edu/~shiller/data.htm), Pzena Analysis
*The probability of loss as used throughout this paper is defined as the probability that the value of an investment (including interest and dividends) is lower on the final day of the measurement period than it was on the first day.

First, as holding periods get longer, the volatility of returns declines significantly, as does the probability of losing money. While 38% of the months in the last 140 years have had losses, an investor in the equity markets would have only been in the red after ten years 3% (12% after counting the effects of inflation) of the time. And the variability of outcomes, measured as the standard deviation of returns, has been quite reasonable.

Definition of Risk

We would also like to offer an alternative framework for defining and measuring risk that is better aligned with a long-term investor's time horizon. We believe risk should be defined as the permanent impairment of capital, not short-term volatility. Although unpleasant, short-term price swings in a security really shouldn't matter to a long-term holder, to whom the key issue is whether they've earned a meaningful long-term real return on the asset over the entire holding period (assuming the portfolio is diversified enough so that the idiosyncratic risk of a specific security is mitigated/eliminated).

So how can capital be impaired over the long term? We see three ways:

- Systematically overpaying for an asset (i.e., paying $100 for something worth $50). This generally means avoiding bubbles in financial markets.
- Bankruptcy of the issuer of the security. This generally means avoiding issuers with high levels of debt.
- Not being compensated for inflation. This generally means avoiding instruments with fixed payment terms (i.e., bonds) or where the issuer doesn't have the ability to adjust to changes in macroeconomic conditions (i.e., commodities).

We will analyze each of these risks and, as we will also see, the widely used alternatives to equities – bonds, commodities, and hedge funds - are notoriously poor choices if the goal is to minimize the probability and size of real loss over the long term.

Bonds – An Illusion of Safety

Let's pose a basic question: which is a riskier investment – the stock market or the bond market? Whether measured on a short or long-term basis, the bond market has lower volatility than the stock market. But the bond market has a significantly higher probability of real loss (i.e., not earning enough to cover inflation). This is because long-term interest rates have been notoriously poor predictors of future inflation. For equity markets, the average real return for a ten-year holding period over the past 140 years has been 6.9% while for bonds the real ten-year return has averaged 2.5%. But, stocks come with higher risk, right? There clearly is more volatility.

Bonds are Actually Riskier Than Stocks
Measures of Risk and Return
Ten-Year Holding Periods (1871 - 2011)

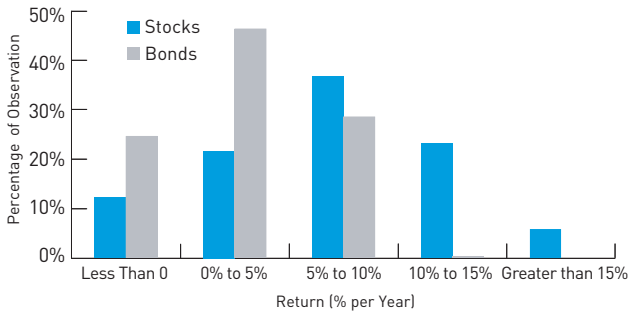
	Stocks	Bonds
Average Annual Real Return	6.9%	2.5%
Standard Deviation of Ten-Year Returns	5.2%	3.3%
Probability of Loss	12%	25%
Worst Ten-Year Loss	46%	32%

Source: Robert Shiller (http://www.econ.yale.edu/~shiller/data.htm), Pzena Analysis

Having said that, there has been more than twice the chance of a real loss in the bond market than there has been in the stock market. And while the maximum ten-year loss was 46% (the ten years ending February, 2009) for stocks versus 32% for bonds, the frequency of ten-year periods for stocks with losses greater than the worst case for bonds was around 1 in 100.

When looked at graphically, we can see the tradeoff more clearly:

Frequency of Ten-Year Real Returns
1871 - 2011



Source: Company Reports

The returns to bondholders are clearly more tightly distributed (hence the lower volatility) than returns to stockholders; for this reason, bonds are considered less risky. But there is a greater probability of low returns in bonds than stocks and a higher probability of high returns in stocks. Bonds have a 71% chance of earning less than 5% on an inflation-adjusted basis and stocks have only returned less than 5% about one-third of the time. With worst case real losses that have been nearly as bad in the bond market as in the stock market, it seems rather difficult to conclude that bonds are safer.

Commodities = Inflation Hedge?

An often ill-conceived strategy to hedge the risk of inflation is commodities. But commodities have been notoriously bad at beating inflation, and, with the exception of a handful of periods, have produced negative real returns. Consider the following data:

Commodities do a Poor Job of Hedging the Risk of Inflation
Measures of Risk and Return
Ten-Year Holding Periods (1960 - 2011)

	Commodity Type		
	Non-Energy*	Metals/Minerals	Crude Oil
Average Annual Real Return	-1.3%	-0.6%	5.2%
Standard Deviation of Ten-Year Returns	3.9%	4.6%	12.3%
Probability of Loss	65%	65%	43%
Worst Ten-Year Loss	59%	63%	74%

Source: World Bank GEM Data (http://databank.worldbank.org/ddp/home.do?Step=12&id=4&CNO=175)
*Includes agriculture, fertilizers, metals & minerals and base metals

Cheap Stocks Can Mitigate Risk
Measures of Risk and Return
Ten-Year Holding Periods (1979 - 2011)

	S&P 500	Cheapest Price To Book Quintile*
Average Annual Real Return	8.5%	11.9%
Standard Deviation of Ten-Year Returns	5.3%	4.4%
Probability of Loss	11%	2%
Worst Ten-Year Loss	46%	22%

Source: Sanford C. Bernstein & Co., Pzena Analysis
*Cheapest quintile of 1,000 largest U.S. stock universe

Since 1960, commodities (with the exception of crude oil and perhaps a few others) have, on average, produced negative real returns measured on a ten year basis. The probability of a real loss is enormous, and the maximum losses are huge. And although oil has had positive real returns, the variability of outcomes and the probability and magnitude of potential loss makes it hard to consider commodities a low risk strategy or even a valid inflation hedge.

So why are equities so much better than commodities or bonds in protecting against inflation? It stands to reason that businesses have the ability to adapt to their environments. Thus a recession, or a period of rising prices, or the emergence of new competitive markets, are met with a response by the management teams to mitigate or even exploit these changes. This was demonstrated in the recent global financial crisis where unprecedented demand drops were met with management actions which reduced the downside to their businesses. Today margins are back to pre-crisis levels.

Controlling for Risk in Equity Investing

Is there a way to further reduce the risks of equity investing systematically to mitigate the other factors that can lead to permanent impairment of capital; not paying too much and avoiding leverage?

Avoid Overpaying

Although trying to predict and avoid bubbles sounds like an obvious way to avoid overpaying for a security, we think there is an even more obvious one: buying cheap stocks, no matter what the environment. Many academic studies support this approach, with the groundbreaking work in this area conducted by Eugene Fama and Kenneth French. Our own work, summarized in the following table, also shows that a consistent strategy of buying undervalued companies can reduce downside risk when measured over the long term.

By concentrating an equity portfolio in the cheapest stocks, the frequency of ten-year loss (measured using the last 30 years that we have data) can be reduced from 11% for the stock market as a whole to only 2% and the maximum loss is cut in half. And the volatility of ten-year returns is actually less than the market. This is in spite of the fact that the standard deviation of monthly returns is actually higher for the cheapest price-to-book quintile (18.1%) than for the S&P 500 (15.0%). The lower monthly volatility did nothing to mitigate the risk of permanent impairment of capital. And, the pièce de résistance - a higher return for the strategy with the lower risk of permanent impairment of capital.

Controlling for Leverage

Capital can also be permanently impaired by excessive financial leverage if the outcome doesn't turn out as well as planned and results in bankruptcy or restructuring.

In the recent global financial crisis, the use of excess financial leverage led to permanent impairment of capital. Take Citigroup as a classic example. While Citi's franchise today is much the same as it was four years ago – the company still has its global credit card business, its regional bank, its emerging markets private bank, its foreign exchange trading business, etc. – the company has six times as many shares outstanding now as it did in 2006. Thus, a share purchased in 2006 now has only one-sixth of its former claim on Citi's franchise; that is permanent impairment of capital.

Avoidance of companies exhibiting a high probability of bankruptcy or dilution can largely be accomplished through the avoidance of stocks exhibiting the most extreme price volatility. We recently published a study on this topic in our Second Quarter 2010 Newsletter, and the summary of the results is shown on the next page:

Eliminating the Most Volatile Stocks Can Further Mitigate Risk
Measures of Risk and Return
Ten-Year Holding Periods (1979 - 2011)

	S&P 500	Low P/B	Low P/B Ex-Most Volatile*	Bonds
Average Annual Real Return	8.5%	11.9%	13.1%	5.1%
Standard Deviation of Ten-Year Returns	5.3%	4.4%	3.4%	2.0%
Probability of Loss	11%	2%	0%	0%
Worst Ten-Year Loss	46%	22%	N/A	N/A

Source: Sanford C. Bernstein & Co., Pzena Analysis
*Here we took the cheapest price-to-book stocks and eliminated the ones with the highest trailing 12-month price volatility – a proxy for excess financial leverage. While price volatility is generally not a good metric for risk, when volatility does become extreme it actually can impact real behavior. Lenders can get nervous and call loans. Customers can get nervous and reduce their business. Management can get nervous and raise equity or sell assets at inopportune times. We observe that while volatility generally creates opportunity for investors, extreme volatility actually creates real fundamental risk.

By avoiding leverage (we use the most extreme trailing 12-month price volatility as a proxy for leverage), and focusing on the cheapest stocks, the long-term risks of equity investing can be mitigated quite nicely. During the last 30 years for which we have data, there were no ten-year periods of real loss in this category. During this particular measurement period where interest rates and inflation rates were generally falling, bonds had no ten-year periods of real loss either. But the extra 800 basis points of annual real returns to a risk-controlled equity portfolio make it difficult to conclude that bonds had a better risk/return trade-off.

Hedge Funds – A Better Alternative?

We have demonstrated how a low price-to-book strategy which controls for the most highly volatile stocks produces superior returns while virtually eliminating the probability of loss. Many investors, however, have turned to hedge funds to accomplish similar objectives – limit downside, produce a respectable return and reduce volatility. So let's examine how hedge funds compare to both a volatility-controlled low price-to-book strategy and bonds (another low volatility asset class) in delivering the desired results.

Hedge Funds Reduce Short-Term Volatility But Opportunity Cost is Large 1990 - 2011

	HFRI Fund of Funds Composite Index	Low P/B Ex-Most Volatile Quintile	Ten Year Treasury Bonds
Average Annual Real Return	5.1%	11.4%	3.9%
Standard Deviation of Ten Year Returns	2.3%	3.8%	1.0%
Probability of 10 Year Loss	0%	0%	0%
Standard Deviation of Monthly Returns	5.8%	17.5%	7.6%

Source: Hedge Fund Research, Inc., Sanford C. Bernstein & Co., Robert Shiller, Pzena Analysis

While hedge funds did a good job of eliminating the probability of loss and narrowing the range of outcomes, they did it with a fairly severe return penalty, owing to the high fees and the use of shorting in a generally upward trending market. What hedge funds did a great job of is reducing monthly volatility. In a skittish market environment, investors are clearly willing to pay a high price to reduce the probability of monthly statement shock. But, does the lower monthly volatility really provide protection from the risk of permanent impairment?

Hedge Funds – Poor Recent Experience

The most recent market experience for hedge fund investors has been less than stellar. If we measure from the market's recent peak in October, 2007, hedge funds haven't protected us from the downside scenario in spite of their lower volatility:

Hedge Funds Haven't Provided Great Downside Protection

	Total Return	Monthly Volatility (Annualized)
S&P 500	-5.2%	20.2%
HFRI Fund of Funds Index	-7.7%	7.1%

Source: Hedge Fund Research, Inc., Pzena Estimates

If we compare the return of the S&P 500 from its peak in October, 2007 to May, 2011, we would have lost 5%. However, the average hedge fund would have lost about 8% over the same period and achieved that result with one-third the monthly volatility.

That's not supposed to happen. The lower volatility is supposed to provide downside protection when the market is declining. Why didn't it? Well very simple – low volatility and downside protection are not correlated over the long term, only over the short term. Using monthly volatility as the metric of risk really doesn't do an institutional plan sponsor much good. Admittedly, the other risk metrics – probability of loss and size of potential loss - seem to favor hedge funds over the time period in question. However, we would argue that with the high fees prevailing today, we are more likely to see results like the last four years than we saw over the prior decade.

Summary

In the end, the goal of any investor should be to maximize returns without incurring significant risks of permanent impairment of capital. It is the hallmark of all the great investors. If we can define a process which (1) makes sure we don't overpay; (2) makes sure we don't assume too much financial leverage; and (3) makes sure we have the flexibility to offset the cost of inflation – then the individual mistakes that we inevitably make as investors will be offset by the cases where we are positively surprised. Then we won't have to worry about the inevitable short-term volatility that arises from the ebb and flow of news that creates emotional and not necessarily rational responses.

To execute such a strategy properly, the notion of short-term volatility as a measure of the riskiness of an asset needs to be

scrapped. While other methods (like the ones we presented here) are also not perfect, their logic is more aligned with the way that good long-term investors truly think. Obviously, there are good short-term investors as well – those that try to exploit and anticipate the ebbs and flows of information. For them, the traditional risk measures are appropriate. For the rest of us, common sense, logic, and the long-term view should prevail. ■