



Confidential

# Risk Mitigation Tail Risk

---

*The Rock Creek Group*

September 27, 2010

The  
Rock  
Creek  
Group



# Risk Mitigation

## *Road Map*

- Overview – Limits of Diversification
- Risk Mitigation Alternatives
- What is Tail Risk and Tail Risk Hedging?
- Market Diversification
- Importance of Tail Hedging
- Characteristics of a Good Tail Risk Hedge
- Tail Hedging Alternatives
- Hedging Instruments
- Tail Hedge Example
- Are Institutional Investors Doing Enough?



# Risk Mitigation

## *Overview*

- Under normal circumstances, strategy diversification is an appropriate tool to mitigate risk
- In periods of high stress, such as the credit crisis of 2008, diversification benefits break down, resulting in all assets moving in tandem (i.e. correlations move to 1.0).
  - For example, as PIMCO recently noted from January 1970 to February 2008, when both the U.S. (Russell 3000 Index) and World ex-U.S. stock markets (MSCI World Ex-U.S. Index) were up more than one standard deviation above their respective full-sample mean, the correlation between them was  $-17\%$ . In contrast, when both markets were down more than one standard deviation, the correlation between them was  $+76\%$ .
- In these periods, normal diversification across multiple asset classes no longer provides the expected benefit
- Rather, assets become bifurcated in two succinct groups – “Risky Assets” and “Risk-Free Assets”



# Risk Mitigation

## *Alternatives*

- One solution could be to simply diversify allocations across these two classes – “Risk Assets” and “Risk Free assets” –
- This alternative would require a significant allocation be made to each class (i.e. 50%/50% or 60%/40%) in order to protect the portfolio from severe stresses
- However, investors, particularly institutional investors, have minimum required rates of return that must be achieved to ensure liabilities are met, but cannot be realized through a portfolio of these “Risky” plus “Risk-Free” assets alone
- The other alternative is to allocate a much larger portion of the portfolio to risky assets (say 75%), but protect the downside on such a portfolio through a small allocation to a Tail Risk Hedge



# Risk Mitigation

## *What is Tail Risk and Tail Risk Hedging?*

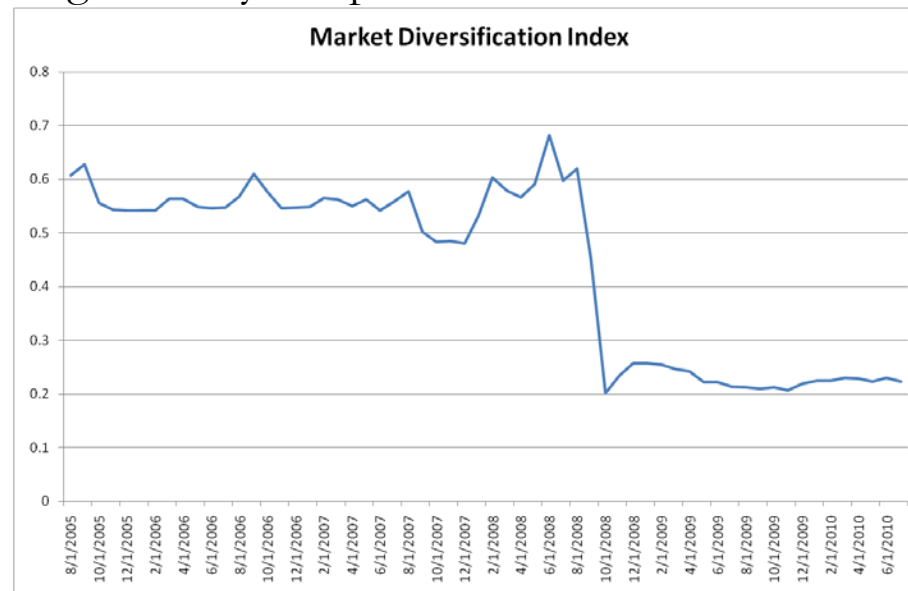
- Tail Risk is the risk that the move in a portfolio is greater than what is defined as a three standard deviation event
- Typically the probability of such a large negative move, assuming normal distribution of returns, should be 1 in 100. In practice, the “100 year flood” seems to occur in every other year
- The reason for the large realized probability of Tail Risk events is because the distribution of returns is leptokurtotic (i.e. has fat tails)
- Tail Risk Hedging refers to allocations within a portfolio designed to reduce the probability of large downward market moves



# Risk Mitigation

## *Market Diversification*

- The Market Diversification Index is a measure of the potential benefits of diversification across asset classes
- In September 2008 with the credit crisis unfolding, the benefit from diversification all but disappeared as all risky asset values plummeted
- In the current “risk-on”/ “risk-off” market sentiment, the benefits from diversifying across asset classes remains low
- In such an environment, the rationale for including tail hedges explicitly in portfolio is significantly sharper



The information set forth above is not intended as, nor should it be interpreted to be, an offer to buy or sell any security or to participate in any investment or trading strategy.

The business described in this presentation may not be suitable for all investors, and may not be suitable for some investors who qualify to purchase interests.

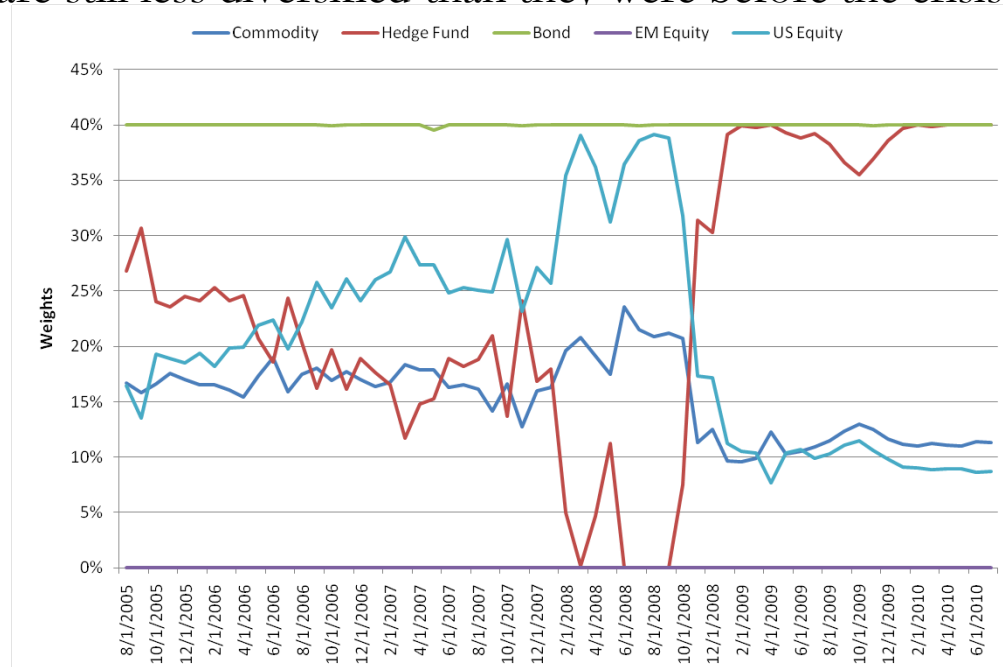
© The Rock Creek Group, LP



# Risk Mitigation

## *Market Diversification*

- The maximum diversified portfolio is the point on the efficient frontier where all asset classes have the same Sharpe Ratio (i.e. risk premium)
- In the current environment, investors would need to allocate significantly more of their portfolio to hedge funds to improve the diversification of their portfolios
- To reiterate, in spite of optimally allocating assets to enhance diversification, portfolio are still less diversified than they were before the crisis



The information set forth above is not intended as, nor should it be interpreted to be, an offer to buy or sell any security or to participate in any investment or trading strategy.

The business described in this presentation may not be suitable for all investors, and may not be suitable for some investors who qualify to purchase interests.

© The Rock Creek Group, LP



# Risk Mitigation

## *Importance of Tail Hedging*

- Investors recognize the need to take systemic risks into account in portfolio construction
- Systemic shocks are recurring, occur frequently, and vary in severity
- The diversification obtainable to portfolios by allocating to different asset classes remains low
- Explicit tail hedges are necessary to provide protection to portfolios during crisis

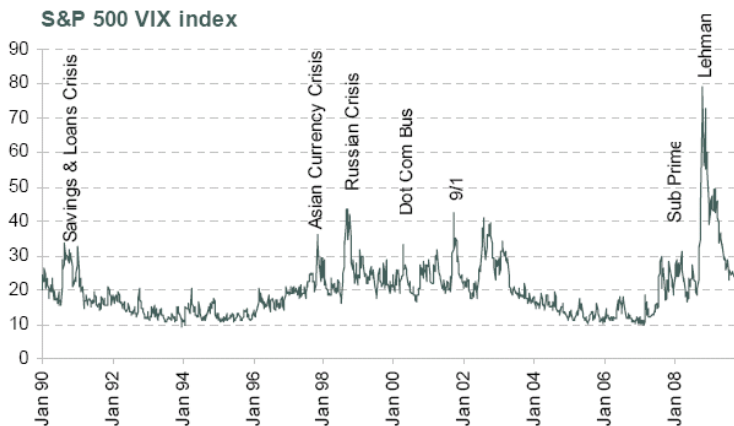
....but major challenges for investors are to:

- select hedges that address potential risks
- manage cost of hedges
- increase hedges dynamically when crisis is building



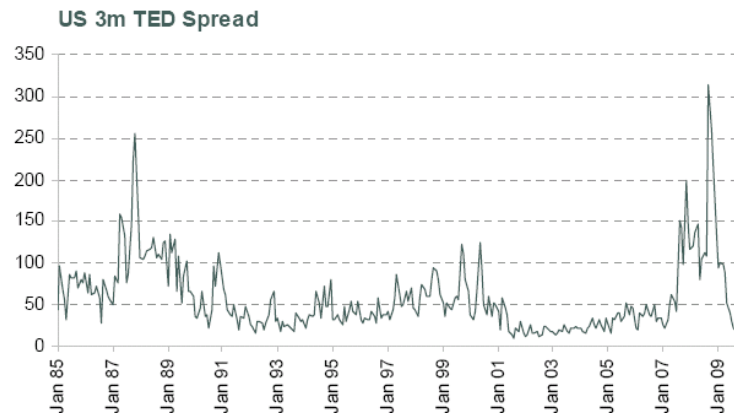
# Risk Mitigation

*Importance of Tail Hedging- Systematic Shocks are Recurring, but Vary*



Source: Bloomberg

VIX: The VIX is calculated and disseminated in real-time by the Chicago Board Options Exchange. It is a weighted blend of prices for a range of options on the S&P 500 index.



Source: Bloomberg

TED Spread: The TED spread is the difference between the interest rates on interbank loans and short-term U.S. government debt ("T-bills"). TED is an acronym formed from T-Bill and ED, the ticker symbol for the Eurodollar futures contract.

While shocks are recurring, the depth and duration of the shocks vary



# Risk Mitigation

## *Importance of Tail Hedging- Preserve Capital*

- The 2008 crisis demonstrated to investors that constructing an un-hedged, static portfolio for dynamic markets is suboptimal
- Investment portfolios should be constructed under the assumption that periodic systemic instability is normal
- Investors need to include tail hedges in the portfolio to address systemic risk
- The return lost on “shocks“ is significant and justifies investing in protection as a matter of course
- Identifying potential tail risks and hedging against them at low cost should reduce uncertainty and allow investors to position their portfolios more aggressively
- Identifying low cost tail hedges in global markets requires considerable investment expertise
- Tail hedges need to be managed dynamically in times of low systemic risk to reduce the cost of hedging, and in times of systemic crisis to both increase and adapt and to harvest the benefits



# Risk Mitigation

## *Characteristics of a good Tail Risk Hedge*

- A true Tail Risk Hedge will:
  - perform well in stress markets and be uncorrelated to risky asset classes
  - be well diversified as investors cannot predict the single instrument that will work in a crisis
  - be cost effective requiring only modest capital deployment, so as to not be a significant drag on performance outside of stressed markets
  - be liquid in all environments, stressed and normal functioning markets
  
- There is no single asset that can take the place of a “tail risk hedge”. Investors must consider a range of options to meet their needs. For example, short term hedges are typically more expensive, but very liquid whereas long-term hedges are less expensive, but less liquid
  
- In order to prevent significant performance degradation in normal functioning markets leverage, typically gained through derivatives, must be employed in Tail Risk Hedges



# Risk Mitigation

## *Tail Hedging Alternatives*

- There are different alternatives for hedging investment portfolios during periods of extreme adverse market movements. They include:
  - Volatility managers –are generally long volatility and benefit from increases in volatility that accompany market crises
  - Tactical Trading managers –are opportunistic and decrease market exposure during crises. They have low correlation to equity and credit managers
  - CTA managers –are trend following strategies and can protect portfolios if the increase in volatility in the market is accompanied by a downward trend in asset prices
  - Hedge funds with customized hedges – portfolios may be exposed to a variety of factors and hedge funds with customized hedges may be used to protect the portfolio against an adverse move in a specific factor



# Risk Mitigation

## *Customized Hedging Instruments*

- Equities – Futures, call and put options, ETFs
  - Credit – Credit default swaps (loans, high-yield, asset-backed securities)
  - Rates – Treasury futures, interest rate swaps
  - Ex – Currency forwards
  - Commodities – ETFs, futures
- 
- Futures/ETFs can be used to hedge price levels
    - Cannot use them to hedge liquidity or leverage risks
  - Options can be used to hedge volatility
    - Provide downside protection without sacrificing upside potential
    - Time decay results in costs if market does not demonstrate volatility
    - Requires constant rebalancing as hedge ratio will change with moves in the market

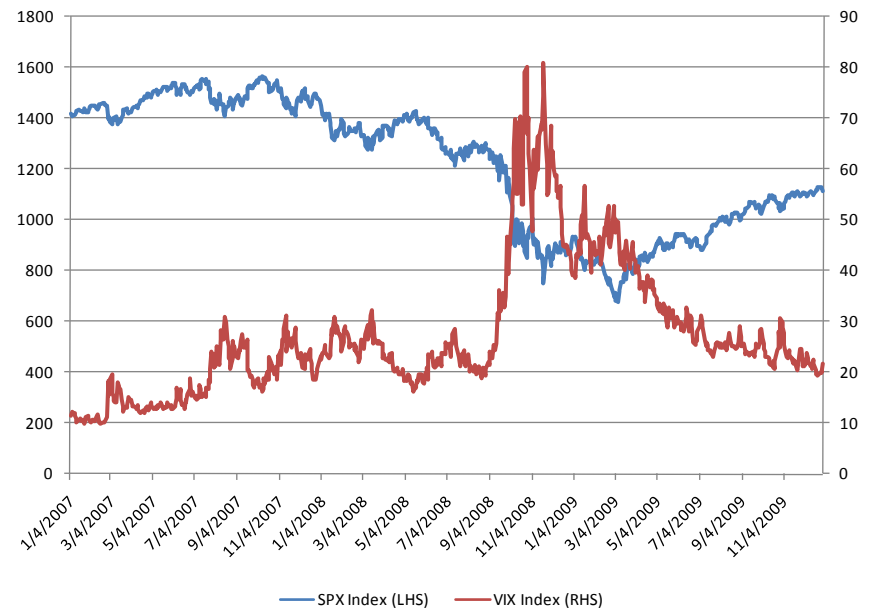


# Risk Mitigation

## *Tail Hedge Example – Long VIX Futures*

- The VIX is a weighted blend of prices for a range of options on the S&P 500 index.
- The VIX Index has a negative correlation to the S&P 500 and is considered a useful tool to hedge against the potential downside of the broad equity market
- While the spot VIX is difficult to replicate there is a market in short-dated and long-dated VIX futures
- The S&P 500 VIX Short-Term Futures Index measures the return from a daily rolling long position in the first and second month VIX futures contracts.
- The VIX has had a convexity profile as a one percent decrease in the S&P 500 was accompanied by a 4.26% average increase in the VIX, while a one percent increase in the S&P 500 was accompanied by a 2.3% decrease in the VIX

VIX vs. S&P 500 (Jan 2007- Dec 2009)





# Risk Mitigation

## *Are Institutional Investors Doing Enough?*

- Equities
  - Most are concerned with equities – some institutional investors are using costless collars 10% to 15% out of the money
- Inflation
  - Concerns about inflation are leading some plans to evaluate use of TIPs and constant maturity swaps as alternatives
- Credit
  - Some institutional investors are retaining credit exposure and not actively hedging credit risk as yet
- Commodities
  - Some institutional investors have reduced commodity exposure and keeping their remaining exposure un-hedged
- Private Equity
  - Investors are concerned about private equity exposure but as yet are not hedging the exposure due to the difficulties hedging liquidity risk
- Hedge Funds
  - Investors are increasing allocations to liquid hedge fund strategies able to better protect capital and generate returns in volatile markets