

## *December 2009 Newsletter*

What a difference a year makes! A year ago we were in the middle of the worst financial crisis in history. Through November 30, 2008 world equity markets were down 45% while S&P was down 38%. The VIX index, which can be considered a measure of risk aversion, rose to unprecedented levels reaching closing at 55.84 at the end of November after reaching an all time high of 80.6 on October 27, 2008.

In contrast, 2009 has been a very positive year. As of November 30, 2009 MSCI World Index was up 20.54% while S&P 500 was up 21.3% and VIX has declined to 23.87. Another sharp difference between 2008 and 2009 could have been observed in both relative and absolute performance of hedge fund strategies. In 2008 hedge funds posted their worst year ever with Barclay Hedge Fund Index losing 21.92% through November 30, 2008 and 21.63% through December 2008.

The best performing strategy of 2008 were CTAs that posted a gain of 14.09% for 2008. 2009 presented a completely different picture. Preliminary results for November show Barclay Hedge Fund index up 21.64% year to date with virtually all strategies posting positive results. Only short sellers posted negative results for this year with Barclay Equity Short Bias index being down 14.56%. The best performing strategy of 2009 turned out to be the strategy that many have declared dead in 2008 - Convertible Arbitrage. Barclay Indexes show Convertible arbitrage managers up 49% year to date after being down 27.66% last year. Conversely the best strategy of 2008 (CTAs) have posted lackluster performance with a gain of only 1.26% year to date.

Two obvious questions arise:

1. What explains such difference in performance of hedge fund strategies?
2. What strategies should investors allocate to in 2010?

The answer to the second questions requires a consult of a crystal ball. We will, however, try to answer the first question and provide investors with framework for answering the second question.

At the very basic level hedge funds can be described as entities that go long, go short and apply leverage. The long and short exposures are different based on the hedge fund strategies and can be applied in a variety of markets. Such exposures are, however, not constant and change in various market conditions. Analysis of hedge fund strategy's risk/return profile, therefore, requires two steps

1. Identification of a set of distinct market conditions (regimes).
2. Analysis of the strategy's return profile in each regime.

## Identification of Market Regimes

There are numerous ways of identifying market regimes. A simple, non scientific way may consist of qualitatively breaking down market history into several sub periods and then assigning descriptive names. We used a more scientific approach in which we analyzed performance of market asset classes such as Global Equities, US Equities, Emerging Market Equities, Credit, Equity Volatility, Oil and Interest Rates. We analyzed monthly time series for all of these factors from June 1995 through July 2009. Using cluster analysis technique we were able to identify five distinct market regimes. Table 1 demonstrates average monthly returns for these factors in all five regimes.

Regime	Global Equities	US Equities	Emerging Markets	Growth Equities	Value Equities	Equity Volatility	Credit	Interest Rates	Gold	Oil
1	-4.36%	-4.37%	-4.89%	-4.92%	-4.42%	25.51%	-1.57%	2.54%	-0.40%	1.77%
2	5.05%	5.41%	6.32%	6.75%	4.13%	-8.18%	0.43%	-0.31%	2.31%	7.13%
3	1.07%	1.47%	1.18%	1.16%	1.44%	-2.82%	0.95%	-0.58%	0.31%	0.03%
4	5.80%	5.21%	10.03%	6.16%	4.47%	-14.45%	4.69%	3.03%	-0.21%	13.29%
5	-3.50%	-7.03%	-5.31%	-4.05%	-2.45%	4.55%	-0.79%	-7.46%	5.04%	-9.45%

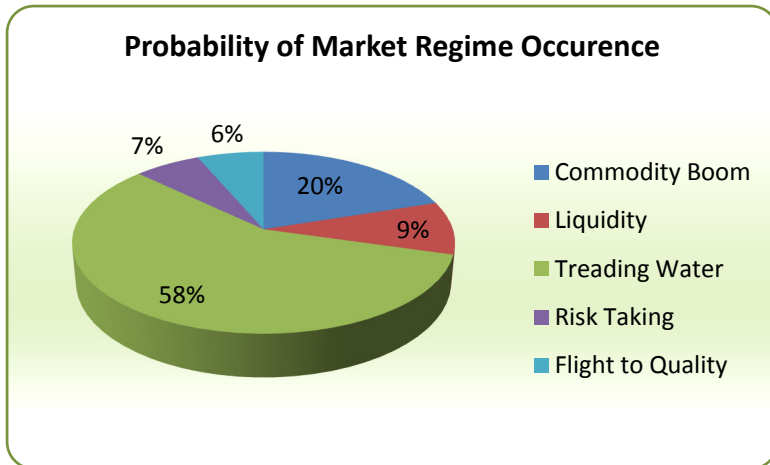
**Table 1**

We can observe distinct properties of the five regimes. Regimes 1 & 5 clearly represent stress environment with selloff in all equity markets and credit. There are, however, two differences between these two regimes. The negative return of Interest Rate factor in regime five represents rally in prices of treasury securities which implies a flight to quality scenario. Regime 1, on the other hand, represents a selloff in all securities except for commodities (Oil).

Similarly we have two regimes with extreme positive returns (Regimes 2 & 4). As with regimes 1 & 5 these two regimes are different with respect to the interest rate factor. Regime 4 with higher returns in all asset classes represents an investment in riskier securities (positive returns in Interest Rates represents selling of treasuries). Regime 2 has lower (though still impressive) returns in all asset classes as well as purchase of treasuries. Equity Volatility (VIX) is falling in both regimes. Finally regime 3 represents a more “normal” calm regime. To make further analysis easier to follow, we assigned the following names to the five regimes.

- Regime 1 - Commodity Boom
- Regime 2 - Liquidity (“Buy Everything Regime”)
- Regime 3 - Treading Water
- Regime 4 - Risk Taking
- Regime 5 - Flight To Quality

We should note that our methodology does not produce regimes with equal number of data points. We would not expect the Flight To Quality regime occur with the same probability as the Treading Water regime. Figure 1 demonstrates the probability of occurrence of each regime in our dataset.



**Figure 1**

It should also be noted that probability of being in any given regime next month is dependent on the current regime. Probability of transition between regimes is represented in the following transition matrix (Table 2)

	Commodity Boom	Liquidity	Treading Water	Risk Taking	Flight to Quality	Total
Commodity Boom	18%	12%	50%	9%	12%	100%
Liquidity	25%	6%	56%	6%	6%	100%
Treading Water	20%	9%	62%	4%	4%	100%
Risk Taking	20%	10%	40%	20%	10%	100%
Flight to Quality	18%	9%	55%	9%	9%	100%

**Table 2**

The reader can observe that probability of transitioning into Flight To Quality regime from Treading Water regime is 4%. The Flight to Quality regime seems to be relatively short, since the probability of staying in this regime after entering it is only 9%.

Now that we have identified five unique regimes, we need to examine how each hedge fund strategy performs in these regimes. Table 3 demonstrates average monthly returns of eleven hedge fund strategies under the five regimes.

Strategy	Commodity Boom	Liquidity	Treading Water	Risk Taking	Flight to Quality
Equity Long/Short	-0.58%	3.54%	0.94%	2.51%	0.67%
Event Driven	-0.63%	2.15%	1.13%	2.80%	-0.31%
Merger Arbitrage	-0.07%	1.45%	0.88%	1.05%	0.42%
Emerging Markets	-2.32%	4.35%	1.43%	5.70%	-1.69%
Equity Market Neutral	0.35%	1.37%	0.55%	-0.16%	0.50%
Convertible Arbitrage	-0.23%	1.00%	0.68%	3.01%	0.12%
Distressed Securities	-0.71%	1.00%	1.15%	2.49%	-0.78%
Fixed Income Arbitrage	-0.31%	0.50%	0.57%	1.24%	0.03%
Global Macro	0.05%	2.48%	0.77%	1.41%	0.79%
CTA	1.17%	0.76%	0.33%	-0.31%	0.33%
Multi Strategy	0.02%	1.33%	0.91%	2.06%	0.55%

**Table 3**

Several observations are immediately noticeable.

1. All hedge fund strategies produce positive returns in Treading Water regimes.
2. As expected, CTAs and Global Macro managers outperform other strategies in extreme stress environments. CTA's however significantly underperform in more positive market environments.
3. Global Macro managers may provide better diversification than CTAs by posting positive results in all environments. They do, however, lack the upside of CTA managers in the Commodity Boom regime.
4. Surprisingly Equity Long/Short produces positive returns in Flight to Quality regime.

In addition to expected returns, portfolio construction requires understanding of correlations and volatility. We have examined correlations among hedge fund strategies. Under the Treading Water regime correlations among all strategies are positive.

	1	2	3	4	5	6	7	8	9	10	11
1. Fixed Income Arbitrage	100%	63%	30%	50%	47%	54%	68%	38%	44%	44%	14%
2. Convertible Arbitrage	63%	100%	30%	50%	38%	52%	77%	33%	50%	36%	17%
3. Emerging Markets	30%	30%	100%	63%	63%	53%	44%	20%	17%	60%	23%
4. Event Driven	50%	50%	63%	100%	82%	79%	75%	39%	56%	68%	31%
5. Equity Long/Short	47%	38%	63%	82%	100%	60%	64%	49%	45%	75%	23%
6. Distress	54%	52%	53%	79%	60%	100%	62%	35%	33%	57%	25%
7. Multi Strategy	68%	77%	44%	75%	64%	62%	100%	51%	71%	61%	33%
8. Equity Market Neutral	38%	33%	20%	39%	49%	35%	51%	100%	41%	47%	17%
9. Merger Arbitrage	44%	50%	17%	56%	45%	33%	71%	41%	100%	37%	22%
10. Global Macro	44%	36%	60%	68%	75%	57%	61%	47%	37%	100%	69%
11. CTA	14%	17%	23%	31%	23%	25%	33%	17%	22%	69%	100%

**Table 4**

The average pair-wise correlation among all strategies under this regime is 47%. CTAs have the lowest correlations to all other strategies, though the correlations are positive. It's often said that correlations increase during stress. It seems that the results depend on the stress. Correlations for Commodity Boom regime are shown in Table 5 and seem to confirm this hypothesis.

	1	2	3	4	5	6	7	8	9	10	11
1. Fixed Income Arbitrage	100%	84%	58%	50%	39%	71%	79%	5%	56%	17%	-23%
2. Convertible Arbitrage	84%	100%	58%	57%	44%	77%	93%	26%	59%	22%	-17%
3. Emerging Markets	58%	58%	100%	87%	85%	82%	73%	20%	82%	63%	-21%
4. Event Driven	50%	57%	87%	100%	87%	86%	74%	35%	90%	56%	-35%
5. Equity Long/Short	39%	44%	85%	87%	100%	74%	63%	37%	76%	75%	-18%
6. Distress	71%	77%	82%	86%	74%	100%	82%	25%	78%	37%	-40%
7. Multi Strategy	79%	93%	73%	74%	63%	82%	100%	39%	78%	45%	-11%
8. Equity Market Neutral	5%	26%	20%	35%	37%	25%	39%	100%	32%	46%	23%
9. Merger Arbitrage	56%	59%	82%	90%	76%	78%	78%	32%	100%	53%	-32%
10. Global Macro	17%	22%	63%	56%	75%	37%	45%	46%	53%	100%	42%
11. CTA	-23%	-17%	-21%	-35%	-18%	-40%	-11%	23%	-32%	42%	100%

Table 5

Though the average correlation among all strategies has declined to 46%, it was heavily influenced by CTAs that being a natural crisis diversifier have negative correlations to most other strategies. Excluding CTAs, the average correlation among all strategies has increased to 59%. The Flight To Quality regime provides a different picture.

	1	2	3	4	5	6	7	8	9	10	11
1. Fixed Income Arbitrage	100%	29%	20%	52%	26%	86%	60%	35%	11%	2%	-27%
2. Convertible Arbitrage	29%	100%	30%	59%	47%	43%	79%	43%	58%	24%	-13%
3. Emerging Markets	20%	30%	100%	81%	80%	52%	61%	55%	61%	61%	-7%
4. Event Driven	52%	59%	81%	100%	89%	76%	93%	67%	80%	61%	-8%
5. Equity Long/Short	26%	47%	80%	89%	100%	64%	79%	70%	68%	75%	2%
6. Distress	86%	43%	52%	76%	64%	100%	78%	62%	29%	27%	-32%
7. Multi Strategy	60%	79%	61%	93%	79%	78%	100%	69%	75%	46%	-15%
8. Equity Market Neutral	35%	43%	55%	67%	70%	62%	69%	100%	33%	60%	20%
9. Merger Arbitrage	11%	58%	61%	80%	68%	29%	75%	33%	100%	41%	-14%
10. Global Macro	2%	24%	61%	61%	75%	27%	46%	60%	41%	100%	65%
11. CTA	-27%	-13%	-7%	-8%	2%	-32%	-15%	20%	-14%	65%	100%

Table 6

We can see that correlations among the more directional strategies (Event Driven, Equity Long, Short, Distress and Emerging Markets) do tend to increase in stress regime while the correlations of other strategies seem to decline as these non directional strategies provide diversification. The strategy that provides the best diversification benefit in the stress regime is CTA, which has negative correlations to most other strategies.

Table 7 provides information about annualized volatility of hedge fund strategies under the five regimes.

	Commodity Boom	Liquidity	Treading Water	Risk Taking	Flight to Quality
1. Fixed Income Arbitrage	9.8%	6.3%	3.4%	3.6%	5.7%
2. Convertible Arbitrage	12.0%	4.0%	3.5%	7.6%	7.4%
3. Emerging Markets	19.9%	16.6%	11.8%	10.4%	12.2%
4. Event Driven	10.0%	4.6%	4.6%	4.7%	7.5%
5. Equity Long/Short	9.9%	8.6%	5.2%	3.2%	12.3%
6. Distress	10.4%	6.0%	4.2%	6.0%	10.2%
7. Multi Strategy	7.8%	3.4%	3.1%	3.7%	5.5%
8. Equity Market Neutral	4.0%	3.7%	3.0%	3.4%	4.2%
9. Merger Arbitrage	5.4%	2.9%	2.6%	1.5%	5.3%
10. Global Macro	7.0%	6.4%	5.5%	3.2%	8.5%
11. CTA	8.2%	8.2%	7.1%	4.4%	9.2%

**Table 7**

### Putting It All Together

Understanding the return, correlation profile of the hedge fund strategies is imperative for performing better risk management and portfolio construction analysis. The output of the above analysis can be used as input into various other analytical tools such as portfolio optimization, return forecasting, Monte Carlo simulations and others. Risk-AI, together with our partners at Harbor Hill Management has developed a sophisticated portfolio construction and risk analysis tools that incorporate regime analysis described above. Readers interested to learn more about our process can send an email to [contact@risk-ai.com](mailto:contact@risk-ai.com).

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