# Prisma Capital Partners LP



An Alternative Investment Specialist

# **Global Macro**

Combining Diversification with Return

James Welch August 2012



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# **SUMMARY OF PURPOSE**

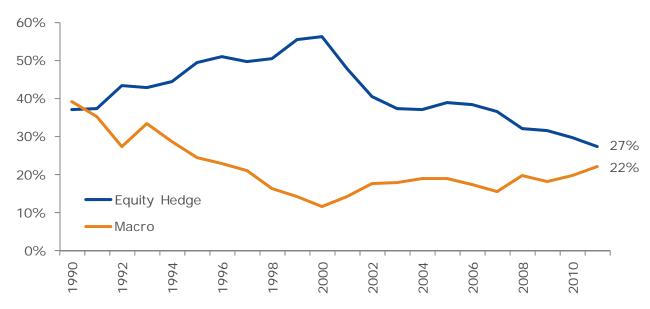
This paper summarizes the key investment characteristics of global macro hedge fund strategies, including managed futures, and suggests ways in which these strategies may be considered in a broader portfolio framework. To place these considerations in the appropriate context, the paper opens with comments regarding recent developments related to the global macro strategy and presents a straightforward classification system to differentiate the key attributes of the various sub-strategies within this quite broad hedge fund category. The paper also examines the potential impact of incorporating global macro strategies into a traditional stock/bond portfolio and suggests ways to assess the success of that diversification strategy.



# INTRODUCTION: IS GLOBAL MACRO BACK IN FAVOR?

Global market participants may well feel the investment landscape has changed radically and perhaps irreversibly since the Great Recession of 2008 and the financial crises that have followed. Investment managers are faced with new challenges, including the rise of correlations within and across risk-oriented asset classes and the heightened volatility of volatility associated with rapid swings between 'risk on' and 'risk off' regimes. One response to this changed environment is to place more emphasis on the search for orthogonal strategies that offer both diversification benefits and attractive risk-adjusted returns. Global macro appears to fit that description.

CHART 1: ESTIMATES OF GLOBAL MACRO'S AND LONG/SHORT EQUITY'S (HEREIN DESCRIBED AS "EQUITY HEDGE") SHARES OF TOTAL HEDGE FUND INVESTMENTS THROUGH TIME (% OF INDUSTRY ASSETS)



Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from Hedge Fund Research (HFR)

As the chart above shows, the broad global macro strategy represented a large percentage of total hedge fund investments back in 1990, when reliable data first became available. Through the bull market of the late 1990's, investors subsequently gravitated toward more directional strategies (e.g., equity hedge) and global macro lost ground, at least on a relative basis. However, there appears to be renewed interest and participation in the strategy, which may be at least partially in response to losses investors have suffered from other hedge fund strategies, as well as from holding risk assets in general. Prisma believes there are also other compelling reasons investors should consider meaningful allocations to this strategy, including its potential for upside returns and its generally high level of liquidity relative to other alternative investment strategies.

### **DEFINING THE GLOBAL MACRO STRATEGY**

Similar to certain other hedge fund strategies, the definition of "global macro" is simultaneously broad and somewhat elusive. In order to be consistent with the global macro strategy definition of index return providers, such as Hedge Fund Research (HFR), this category also includes managed futures strategies, which are most commonly executed by commodity trading advisors

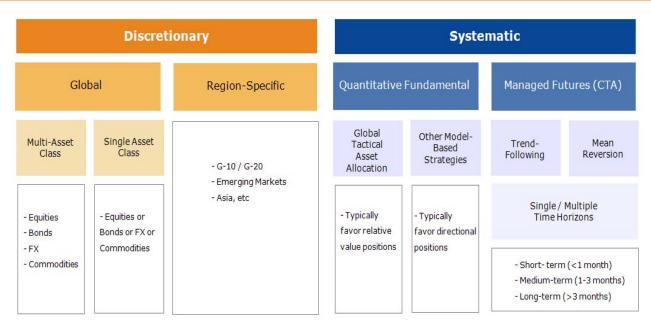


(CTAs). The general consensus among practitioners is that the global macro managers and/or CTAs typically have certain common characteristics, including:

- Flexibility (and competence) to invest across all major asset classes
- A focus on the most liquid investments, many of which are related to broad indices and/or commoditized instruments (e.g., crude oil futures)
- Incorporation of a 'top-down' approach in which predictions of macroeconomic considerations and/or price action play a central role in the investment process
- No long-term structural bias to be long or short any particular market or asset class
- Greater use of leverage than most other hedge fund strategies

Beyond these common features, however, the definition rapidly begins to splinter. For example, some managers employ a discretionary approach to choose their trades and build their portfolios, while others use computers and rely upon a fully systematic approach in which human discretion is completely removed from the investment process. Still other managers may incorporate both discretion and systematic elements into their strategy. Separately, managers may choose to specialize in one or a few asset classes and/or geographic regions. They may also focus on different investment time horizons or have a specific investment style, such as emphasizing momentum (often also called trend-following) or convergence (mean reversion). To clarify these and other divergences, the following chart provides a conceptual taxonomy of the various substrategies within global macro as broadly defined.

CHART 2: CATEGORIZATION OF GLOBAL MACRO SUB-STRATEGIES



Note: The chart above depicts Prisma's general definition of Global Macro based upon market research.



# HISTORICAL RISK AND RETURN CHARACTERISTICS OF GLOBAL MACRO

The long term risk-adjusted track record of the global macro strategy compares favorably with those of traditional asset classes, such as global equity and bond indices. Using HFR data, which represents the equally weighted average returns of all managers who report to this service, Tables 1 and 2 present risk and return statistics for the HFRI Macro Index and two benchmarks for traditional asset classes from the beginning of 1990 through February, 2012, the latest month for which data was available when Prisma performed this analysis, and over the past five years.

TABLE 1: COMPARATIVE INDEX STATISTICS (JANUARY 1990 TO FEBRUARY 2012)

Statistics	HFRI Macro	MSCI Global	JPM Global Bond
Return (annualized)	12.8%	5.6%	7.2%
Volatility (annualized)	7.6%	15.7%	6.0%
Sharpe Ratio	1.15	.10	.54
HFRI Macro Correlation	1.00	.37	.19
Beta/Corr. to S&P 500	.17/.22	.93/.90	.06/.15
Maximum Drawdown	-10.7%	-54.0%	-8.1%

Note: The above index statistics represent monthly returns for the period of January 1990 through February 2012.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from Hedge Fund Research and PerTrac Analytics.

TABLE 2: COMPARATIVE INDEX STATISTICS (MARCH 2007 TO FEBRUARY 2012)

Statistics	HFRI Macro	MSCI Global	JPM Global Bond
Return (annualized)	5.1%	-0.6%	6.9%
Volatility (annualized)	5.5%	20.4%	6.9%
Sharpe Ratio	.57	12	.72
HFRI Macro Correlation	1.00	.32	.34
Beta/Corr. to S&P 500	.06/.22	1.06/.98	.12/.33
Maximum Drawdown	-10.7%	-54.0%	-8.1%

Note: The above index statistics represent monthly returns for the period of March 2007 through February 2012.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from Hedge Fund Research and PerTrac Analytics.

This data illustrates the attractive historical return characteristics of the global macro strategy, both on an absolute risk-adjusted basis (i.e., Sharpe ratio) and relative to traditional equity and bond indices. While global macro has not separated itself from the pack as dramatically over the past five years with respect to return differentials, the strategy's controlled volatility and relatively modest maximum drawdown during this challenging period are consistent with the its longer term track record. Moreover, the strategy's correlation to the equity indices, such as the MSCI Global Index, were actually closer to zero during the past five years than was the case over the full period, indicating global macro's potential provision of incremental diversification benefits during a time when equity markets generally exhibited returns that were both highly volatile and below their long-term historical average.



Global macro's observed low to moderate correlation with traditional asset class returns deserves further mention. Systematic trend-followers, who comprise a meaningful proportion of the managed futures/CTA universe, should theoretically profit from market declines whenever the downtrend is adequately sustained. In addition, because global macro managers as a group exhibit no structural market bias, they are potentially well positioned to capture profits when prices fall. In fact, the correlation of the HFRI Macro Index to the MSCI Global Index for the period from January, 1990, through February, 2012, was only .10 during those months in which the MSCI Global Index was negative, which indicates global macro managers have historically been able to side-step equity market downturns to some extent.

Academic studies have concluded certain global macro strategies have non-linear return profiles relative to the returns of the major global equity indices, such as the S&P 500. Much of this academic work, including papers produced by Fung and Hsieh [2001] and Monarcha [working draft, 2009], has focused on trend-following strategies, which are the most common strategy followed by CTAs. These studies have found managed futures strategies tend to behave like long-straddle positions: they generate increasingly positive returns as the equity markets move increasingly higher or lower, while being most likely to lose money when the equity markets trade within a modest price range.

The payoff pattern of discretionary macro managers is a bit different from that of systematic trend-followers. Prisma has found the return profile of discretionary managers within the macro space has been much more linear/symmetrical in nature relative to the equity markets than is the return profile of CTAs. History also reveals discretionary managers tend to perform a bit less well during equity market downturns than they do when equity markets are rising. However, this pattern exhibits much smaller losses during equity market downturns than is the case for most hedge fund strategies and global macro has generated positive returns on average during those months in which equity markets have had modest to moderate losses. The following chart illustrates the historical payoff patterns for both the managed futures and the global macro category as a whole.

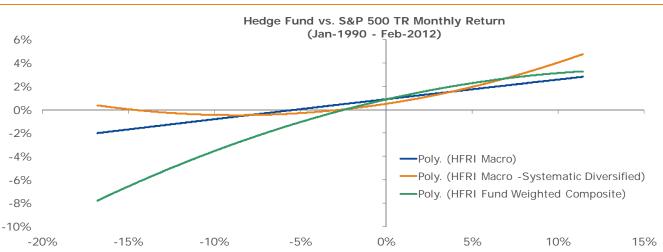


CHART 3: STYLIZED PAYOFF PROFILE FOR DISCRETIONARY MACRO AND MANAGED FUTURES STRATEGIES

Note: The curves in the chart above represent regressions of monthly HFRI data against the S&P 500 Total Return (TF) Index modeled through a second order polynomial trendline.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.



A review of the performance of the HFRI Macro Index during the largest drawdowns of the S&P 500 TR Index since 1990 further illustrates the lack of correlation between global macro strategies and equity index returns.

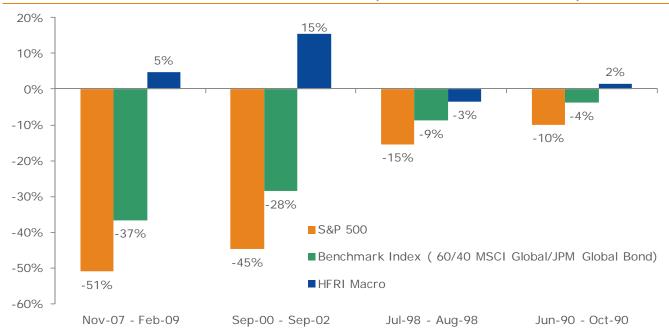


CHART 4: HFRI MACRO VS. LARGEST S&P 500 DRAWDOWNS (JANUARY 1990 - FEBRUARY 2012)

Note: The above index statistics represent performance during the largest S&P 500 Total Return Index drawdowns for the period of January 1990 through February 2012. Blended benchmarks assume annual rebalancing.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.

More recently, the S&P 500 TR Index experienced an interim drawdown of 16.26% from April through September, 2011. The HFRI Macro Index declined 4.12% over that time period as many managers successfully captured the rally in global bonds, which partially offset losses elsewhere in their portfolios.

Chart 5 illustrates how the global macro strategy has performed during the past three U.S. recessions, with broad equity and bond index returns included for comparative purposes.



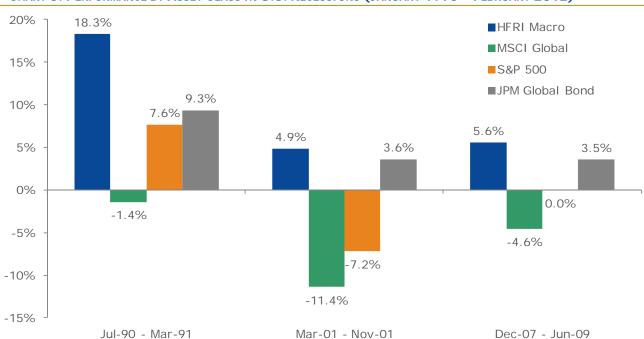


CHART 5: PERFORMANCE BY ASSET CLASS IN U.S. RECESSIONS (JANUARY 1990 - FEBRUARY 2012)

Note: The above index statistics represent performance during U.S. Recession periods from January 1990 through February 2012. Blended benchmarks assume annual rebalancing.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.

Investors may perceive global macro managers tend to thrive on volatility and are likely to make money when volatility is high, which may equate to success when equity markets are falling. However, our analysis reveals global macro managers are somewhat susceptible to rising volatility, although perhaps not as much as are many other investment strategies.

The Table below provides the average monthly return of the HFRI Macro Index for various percentile ranges of monthly average observations of the VIX index.

Table 3: HFRI Macro Average Monthly Return vs. VIX (January 1990 to February 2012)

Percentile	VIX Level	VIX Percentile Range	HFRI Macro
5th	11.8	Up to 5th	2.08%
25th	14.9	5th - 25th	1.47%
50th	19.2	25th - 50th	1.27%
75th	24.3	50th - 75th	1.07%
95th	34.8	75th - 95th	0.26%
100th	62.6	95th - 100th	-0.18%

Note: VIX Level represented by the average VIX level throughout a given month.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from Bloomberg and PerTrac Analytics.



The pattern is clear: global macro actually performed best during the lowest volatility periods, and that performance declined sequentially over rising percentiles of the VIX's levels. For extremely high levels of the monthly average (i.e., at the 95th percentile and above), the average return of the HFRI Macro Index turned slightly negative. As such, global macro managers do not appear to be immune from the vagaries of highly volatile markets. While there are probably multiple reasons this pattern is evident, one critical factor may be heightened volatility is typically accompanied by significant declines in liquidity across most markets, even including the highly liquid markets in which global macro managers typically trade. When liquidity disappears, managers are likely to attempt to reduce the risk in their portfolios and retreat to the sidelines until the storm passes. Such risk reduction trades may well exacerbate trends in volatile markets, thereby increasing the friction costs of the risk reduction process.

## Incorporating Global Macro into a 60/40 Stock/Bond Portfolio

Having reviewed the return and risk characteristics of global macro, we now turn to examining the impact of substituting an allocation to this strategy for a portion of a traditional portfolio invested in long-only equity and fixed income assets. As a proxy for such a traditional portfolio, we combine the MSCI Global Index with the J.P. Morgan Global Bond Index at 60/40 weights. We then reduce each of these weights proportionally by 10% and then by 20% to make room for allocations of the same magnitudes to global macro using the HFRI Macro Index as a proxy. Annual rebalancing is assumed.

Table 4 provides select risk and return statistics for these three proxy portfolios.

TABLE 4: PORTFOLIO STATISTICS (JANUARY 1990 TO FEBRUARY 2012)

Statistics	60% MSCI Global 40% JPM Global Bond	54% MSCI Global 36% JPM Global Bond 10% HFRI Macro	48% MSCI Global 32% JPM Global Bond 20% HFRI Macro
Return (annualized)	6.3%	7.0%	7.7%
Volatility (annualized)	10.7%	9.5%	8.7%
Sharpe Ratio	.22	.32	.43
Skewness	61	52	42
Beta/Corr. to S&P 500	.61/.87	.54/.86	.48/.84
Maximum Drawdown	-36.6%	-31.0%	-25.8%

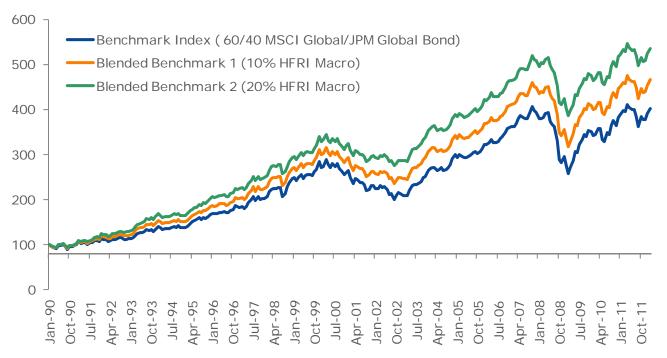
Note: The above index statistics represent monthly returns for the period of January 1990 through February 2012. Blended benchmarks assume annual rebalancing.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.



Chart 6 presents the compound growth of these three portfolio choices over the full period from the beginning of 1990 through to the end of February, 2012.

CHART 6: GROWTH OF \$100 - BLENDED BENCHMARKS VS. 60/40 (JANUARY 1990 - FEBRUARY 2012)



Note: The above index statistics represent monthly returns for the period of January 1990 through February 2012. Blended benchmarks assume annual rebalancing.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.

Narrowing our focus to the more recent historical period, we recalculated these statistics for the five year period ending on 2/29/12. The results are similar and favor the portfolios blended with allocations to global macro, although the benefits were somewhat more muted over the past five years relative to the full period beginning in 1990.

Table 5: Portfolio Statistics (March 2007 to February 2012)

Statistics	60% MSCI Global 40% JPM Global Bond	54% MSCI Global 36% JPM Global Bond 10% HFRI Macro	48% MSCI Global 32% JPM Global Bond 20% HFRI Macro
Return (annualized)	2.1%	2.5%	2.8%
Volatility (annualized)	13.8%	11.7%	10.0%
Sharpe Ratio	0.01	0.04	0.08
Skewness	-0.75	-0.67	-0.55
Beta/Corr. to S&P 500	0.69/.94	0.57/.93	0.48/.91
Maximum Drawdown	-36.6%	-31.0%	-25.8%

Note: The above index statistics represent monthly returns for the period of March 2007 through February 2012. Blended benchmarks assume annual rebalancing.

Source: Prisma Capital Partners LP utilizing the methodology described herein and based on underlying data from PerTrac Analytics.



We note these superior risk-adjusted returns are not available without some indirect costs. Specifically, many global macro strategies are packaged in hedge fund formats, which typically offer less liquidity than traditional long-only investment vehicles. Most global macro hedge funds offer monthly or quarterly liquidity upon a 30 or 45 day notice period, sometimes combined with the requirement that an investor stay in the fund for at least a year to avoid payment of an early redemption fee. The managed futures subset of the global macro universe tends to be more receptive to managed accounts, in which the investor may have the right to liquidate the portfolio within that account on short notice. However, there is typically a high minimum investment requirement for such accounts and, as a trend, managed futures managers appear to be favoring commingled hedge fund vehicles for portfolio management integration and for their greater operational simplicity relative to managed accounts.

More directly, hedge fund managers typically charge higher fees than their long-only counterparts; the largest difference being hedge funds charge performance fees usually equal to 20% of their positive returns. While the hedge fund index returns cited herein are net of all of those fees, performance fees may be considered to be non-standard by certain investors, which might create an additional hurdle within the investment approval process. In addition, to the extent a fund of hedge funds is used to access these investments, another layer of fees would apply. Lastly, global macro managers may offer less than full transparency into their underlying holdings, although this issue can largely be mitigated via the implementation of a managed account.

# IMPLEMENTATION: DECISIONS, DECISIONS...

The resurgence of global macro as a percentage of total hedge fund assets, as depicted in Chart 1, leads to the conclusion many institutional investors are moving into this strategy, or at least are contemplating doing so. But how does one get started? As "global macro" covers a relatively heterogeneous group of sub-strategies, Prisma feels it is important to (i) define the objectives of any allocation to global macro beforehand, and (ii) develop a framework to match specific substrategies and managers to those objectives. For example, certain sub-strategies, including trendfollowing CTAs and most discretionary managers, are largely directional in nature, while others (e.g., global tactical asset allocation funds) attempt to exploit the mean reversion of price trends.

The objectives of adding global macro strategies to a portfolio largely comprised of traditional equity and bond managers will vary according to each investor's needs, but will generally include:

- Enhanced risk-adjusted returns
- Diversification/new sources of alpha
- Improved downside protection



Chart 7 provides a summary of the principal risk and return characteristics of each of the major strategy sub-categories within the global macro universe as defined by Prisma.

CHART 7: CHARACTERISTICS OF GLOBAL MACRO SUB-STRATEGIES

	Discretionary		Systematic	
	<b>Broad</b> (Global, all assets)	Narrow (Single Region/Asset)	<b>Directional</b> (Trend Following)	Mean Reversion (Countertrend)
Return	High	High	Moderate	Moderate
Volatility	Moderate-High	High	High	Moderate
Sharpe	High	Moderate-High	Low	Low-Moderate
Equity Beta	Low	Low-Moderate	Low	Low
Downside Protection	Moderate	Moderate	High	Low

Note: Based on Prisma's general definition of Global Macro

As one can see in the chart above, in Prisma's opinion, there is generally a trade-off between risk-adjusted return and downside protection as one moves from discretionary strategies toward more systematic ones. The exceptions to this statement are mean reversion strategies, which are generally challenged when markets suffer meaningful declines, especially those declines that are outside of the range of past experience.

#### ASSESSMENT OF GLOBAL MACRO MANAGERS

Global macro managers may be assessed in a variety of ways, including against a peer group, relative to a sector index such as the HFRI Macro index, or within a broader portfolio context. While many investors focus on the "micro" aspects of one manager's returns versus another's, Prisma believes the most critical assessment should occur at the level of an investor's entire portfolio.

But first a few comments regarding peer group analysis. Given macro managers come in numerous shapes and sizes, Prisma believes a more precise categorization than a broad strategy index is appropriate to measure individual funds, perhaps using the framework suggested herein. It should also be noted specific managers within the macro sub-strategies may not exhibit exactly the same characteristics as are listed in Chart 7 above; idiosyncrasies are always present within the hedge fund universe. However, Prisma believes a blend of a few managers from a particular category is likely to produce a risk/return profile consistent with the attributes described in this chart. As most macro hedge funds also offer relatively liquid investment terms, mid-course corrections are easier to execute in this strategy than in most others should any particular fund fail to meet initial expectations and/or fall outside of the objective of the investment program.



Within the broader context of a diversified portfolio, assessment can be more challenging. As a first principle, Prisma believes it is important for each investor to know why they have exposure to global macro managers, just as they should do for any other investment in their portfolio. Allocations to global macro strategies should be an attractive proposition as they have the potential to provide orthogonal return streams with low correlations to "risk assets" (i.e., those that exhibit high volatility), particularly during prolonged periods of stress as was most recently evidenced in 2008.

As time passes, investors can begin to assess the quality of the global macro program's results relative to their own measurement paradigm. Specifically, are the managers' risk-adjusted returns matching their expectations and are they having the desired impact on the on the risk-adjusted return of the overall portfolio. Monitoring developments "under the hood" must also be performed on an ongoing basis as a manager's style drift, ill-advised increase in risk tolerance, changes in the investment team, etc. can potentially turn a solid investment into one that is less sound. Finally, different market environments are likely to favor certain sub-strategies within the global macro universe over others, and the appropriate shifting of allocations among these sub-strategies can add incremental alpha over time. Given these considerations, many investors choose to implement their macro investment strategy through funds of funds providers in order to retain professionals with expertise in selecting and monitoring global macro managers, as well as assessing the timeliness of each particular sub-strategy within this broad universe.



## **CITATIONS**

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Monarcha, G., "A Dynamic Study Analysis Model for Hedge Funds", working draft (December, 2009).

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Prisma became affiliates of KKR in October 2012 when KKR acquired 100% of the direct and indirect interests of Prisma. Prisma operates as a part of KKR's public markets business, which includes the asset management activities of KKR Asset Management LLC ("KAM").

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#### Indices

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The **HFRI Fund Weighted Composite Index** ("HFRI Fund Weighted Composite") is a global, equal-weighted index of over 2,000 single-manager funds that report to HFR Database. Constituent funds report monthly net of all fees performance in US Dollar and have a minimum of \$50 Million under management or a twelve (12) month track record of active performance. The HFRI Fund Weighted Composite Index does not include Funds of Hedge Funds. (Source: Hedge Fund Research)



The HFRI Macro (Total) Index ("HFRI Macro") includes over 1200 investment managers which trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency and commodity markets. Managers employ a variety of techniques, both discretionary and systematic analysis, combinations of top down and bottom up theses, quantitative and fundamental approaches and long and short term holding periods. Although some strategies employ RV techniques, Macro strategies are distinct from RV strategies in that the primary investment thesis is predicated on predicted or future movements in the underlying instruments, rather than realization of a valuation discrepancy between securities. In a similar way, while both Macro and equity hedge managers may hold equity securities, the overriding investment thesis is predicated on the impact movements in underlying macroeconomic variables may have on security prices, as opposes to EH, in which the fundamental characteristics on the company are the most significant are integral to investment thesis. (Source: Hedge Fund Research)

The HFRI Macro: Systematic Diversified Index ("HFRI Macro – Systematic Diversified") includes diversified strategies that have investment processes typically as function of mathematical, algorithmic and technical models, with little or no influence of individuals over the portfolio positioning. Strategies which employ an investment process designed to identify opportunities in markets exhibiting trending or momentum characteristics across individual instruments or asset classes. Strategies typically employ quantitative process which focus on statistically robust or technical patterns in the return series of the asset, and typically focus on highly liquid instruments and maintain shorter holding periods than either discretionary or mean reverting strategies. Although some strategies seek to employ counter trend models, strategies benefit most from an environment characterized by persistent, discernable trending behavior. Systematic: Diversified strategies typically would expect to have no greater than 35% of portfolio in either dedicated currency or commodity exposures over a given market cycle. (Source: Hedge Fund Research)

The J.P. Morgan Global Aggregate Bond Index ("JPM Global Bond") consists of the JPM GABI US, a U.S. dollar denominated, investment-grade index spanning asset classes from developed to emerging markets, and the JPM GABI extends the U.S. index to also include multi-currency, investment-grade instruments. Launched in November 2008, the JPM GABI represents nine distinct asset classes: Developed Market Treasuries, Emerging Market Local Treasuries, Emerging Markets External Debt, Emerging Markets Credit, US Credit, Euro Credit, US Agencies, US MBS, Pfandbriefe – represented by well-established J.P. Morgan indices. The JPM GABI US is constructed from over 3,200 instruments issued from over 50 countries, and collectively represents US\$8.6 trillion in market value. The JPM GABI is constructed from over 5,500 instruments issued from over 60 countries and denominated in over 25 currencies, collectively representing US\$20 trillion in market value. The JPM Morgan)

The MSCI World TR USD Index ("MSCI Global") is a free float-adjusted market capitalization index that is designed to measure global developed market equity performance. As of May 2007, the index consisted of the following 23 developed market country indices in North America, Europe and the Asia/Pacific Region: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States. Each component country index is a sampling of equity securities across industry groups in such country's equity markets. Performance is shown in U.S. dollar terms assuming the reinvestment of gross dividends. (Source: MSCI)

The **S&P 500 TR** ("S&P 500 TR") has been widely regarded as the best single gauge of the large cap U.S. equities market since the index was first published in 1957. The index has over US\$ 3.5 trillion benchmarked, with index assets comprising approximately US\$ 915 billion of this total. The index includes 500 leading companies in leading industries of the U.S. economy, capturing 75% coverage of U.S. equities. (Source: Standard and Poors)

The **CBOE Volatility Index ("VIX")** is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices. Since its introduction in 1993, VIX has been considered by many to be the world's premier barometer of investor sentiment and market volatility. (Source: Chicago Board Options Exchange)

