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CTA/Managed Futures Strategy Benchmarks Performance and Review

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Working Paper: CISDM # 3/2007

Original Version: December 17, 2006
Current Version: March 2, 2007

Abstract

In this paper we provide: 1) a brief synopsis of the benefits of managed futures investment; 2) a short review of manager based CTA benchmark construction; and 3) an empirical analysis on the relative performance of various CTA benchmarks (non-investible manager based indices, investible manager based indices, and passive security based indices). In this analysis the various CTA indices are also compared on a zero risk (e.g., Treasury Bill), total risk (Sharpe Ratio), market factor risk (e.g., S&P 500) and strategy risk (e.g., passive futures based CTA index) and peer group basis (investible and non-investible manager based indices). Lastly, for a selected set of CTAs with full data over the period of analysis an example of the use of various CTA benchmarks in determining excess peer group return, and zero risk, total risk, market risk or strategy (futures based) risk excess return is provided .

CTA/Managed Futures Strategy Benchmarks
Performance and Review

1. Introduction

1.1 Managed Futures Description

The term *managed futures* represents an industry comprised of professional money managers known as *commodity trading advisors* (CTAs)[1] or *commodity pool operators* (CPOs)[2] who manage client assets on a discretionary basis, using global forward, futures and options markets as the primary investment medium. Managed futures provide direct exposure to international financial and non-financial asset sectors while offering (through their ability to take both long and short investment positions) a means to gain exposure to risk and return patterns not easily accessible with investment in traditional long-only stock and bond portfolios as well as in many alternative investments such, real estate, private equity, or commodities. Previous research (CISDM, 2006) has shown that managed futures often provide: 1) A reduction in the volatility of stock and bond portfolios as the result of managed futures low or negative return correlation with stock and bond markets; and 2) Enhanced returns to stock, bond, and stock and bond portfolios during economic environments in which traditional stock and bond investments offer limited return opportunities.

While academic research has centered primarily on the benefits and risks of managed futures, less work exists on determining the relative performance benefits of individual CTAs or individual CTA strategies. One reason for the lack of research in this area is that traditional multi-factor benchmark models which are used to describe the market factors driving traditional stock and bonds as well as many hedge fund strategies have little use in describing the return behavior of CTAs. This is mainly due to the underlying strategy focus of CTAs which results in investment holdings which do not traditionally track long only stock and bond indices. In fact, managed futures have been described principally as absolute return strategies since their goal was to obtain positive returns across a variety of market environments. This approach has often led to a low exposure to traditional equity benchmarks (e.g., zero beta) and as a result, relative performance has often been measured in comparison to the risk free rate. Today, it is well understood that managed futures require a broader understanding of the underlying risk structure of the

[1] CFTC defines Commodity Trading Advisor (CTA) as any person, who, for compensation or profit, directly or indirectly advises others as to the advisability of buying or selling commodity futures or option contracts.
[2] CFTC defines Commodity Pool Operator (CPO) as any individual or firm that operates a commodity pool. (For example: If a pool is organized as a limited partnership, its general partner typically is its CPO.) A commodity pool is an investment trust, syndicate, or similar form of enterprise operated for the purpose of trading commodity futures or option contracts.

strategy and that a range of benchmarking alternatives may be used to provide an understanding of the underlying returns to a CTA strategy and its performance relative to similar strategies.

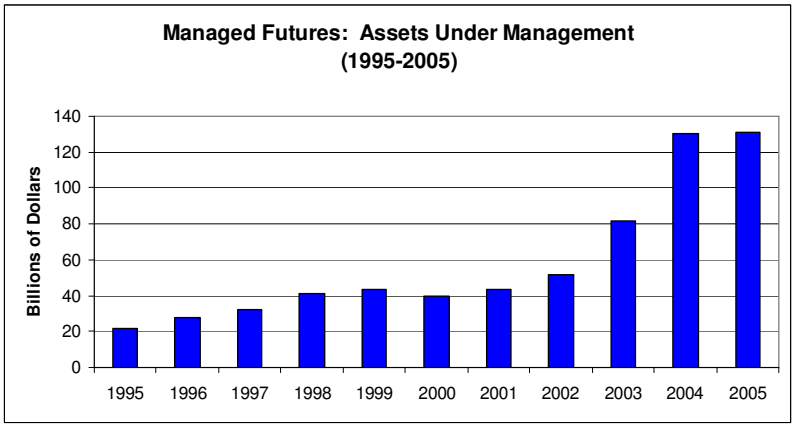
It is not possible in this analysis to convey all the details related to the benchmarking of managed futures. In this paper we provide: 1) a brief synopsis of the benefits of managed futures investment; 2) a short review of manager based CTA benchmark construction; and 3) an empirical analysis on the relative performance of various CTA benchmarks (non-investible manager based indices, investible manager based indices, and passive security based indices). In this analysis the various CTA indices are compared on a zero risk (e.g., Treasury Bill), total risk (Sharpe Ratio), market factor risk (e.g., S&P 500), strategy risk (e.g., passive futures based CTA index) and peer group basis (investible and non-investible manager based indices). Lastly, for a selected set of CTAs with full data over the period of analysis an example of excess return determination on a zero risk, total risk, market risk, strategy (passive futures based CTA index) and peer group basis is provided.

Results indicate that passive security based strategy replicates (where available) often provide a more complete model of return estimation that simple single factor models. Results also indicate that current non-investible and investible manager based indices (even at the strategy level) may need to be separated into more detailed groupings in order to provide reasonable peer group representation of similar CTA managers. In addition, evidence is shown that while both passive security (futures) based strategy benchmark and peer group benchmarks can be created for CTAs which follow more systematic based trading models, for discretionary managers the creation of similar peer groups or security based benchmarks is difficult.

1.2 Growth and Benefit of Managed Futures

Futures and options have been used for centuries both as a risk management tool and as a return enhancement vehicle. Managed futures, as an investment alternative, has been available primarily since the 1970's and has experienced significant growth over the past several decades. As shown in Exhibit 1, the assets under management in the CASAM/CISDM CTA database has grown from approximately $22 billion in 1995 to about $132 billion at the end of 2005.

Exhibit 1: Managed Futures Assets Under Management



Source: CISDM

The growth in investor demand for managed futures products indicates increased investor appreciation of the potential benefits of managed futures. Such benefits include reduced portfolio risk, potential for enhanced portfolio returns, ability to profit in different economic environments, and the ease of global diversification[3]. Furthermore, managed futures benefits from the special opportunities that futures/options traders have in lower transaction costs, lower market impact costs, use of leverage, and trading in liquid markets.

1.3 General Description of Managed Futures

Managed futures have long been regarded as skill-based investment strategies. Skill-based strategies obtain returns from the unique skill or strategy of the trader. Given that these strategy returns are based on managers' attempting to maximize returns within the parameters of their trading strategy and are not managed to track a particular stock or bond index, CTAs are frequently referred to as 'absolute return strategies'. Because managed futures are actively managed, trader skill is important. However, the lack of direct stock or bond index tracking by CTAs does not mean that managers do not have similar sensitivities to traditional market factors or that a CTA index of like managers with a common basis of return movement cannot be created. For instance, it has been shown (Spurgin, Schneeweis, and Georgiev 2003) that specific managed futures returns are also driven by systematic movement in market factors (such as price momentum) that can be replicated using similar traded securities (futures). In fact, a significant majority of CTAs apply momentum-based strategies.

[3] An often overlooked benefit to U.S. investors is that actual investment in overseas futures contracts to a U.S. investor may only exposes the investor to exchange rate risk on the change in the value of the futures contract and the required margin requirement of the foreign futures exchange.

It is important to note that many managed futures strategies trade primarily in futures markets, which can be considered a net zero sum game. If CTAs were only trading against other CTAs then one may conclude that managed futures returns were based solely on manager skills. However, academics and practitioners[4] have shown that some spot market players are willing to sell or hedge positions even if they expect spot positions to rise or fall in their favor (e.g., for instance, currency and interest rate futures may be traded profitably as traders act in full knowledge of government policy to smooth price movements).[5] In brief, one may think of managed futures returns as a combination of manager skill and an underlying return to the strategy itself.

2. CTA Index Construction

2.1 CTA Index Design

In the traditional asset area, a wide set of manager based (e.g., Morningstar, Lipper) and systematic passive stock and bond indices (e.g., S&P 500, Russell 2000) exist, each of which differ in performance, selection and classification. Similarly in the CTA area, a number of manager based peer group based indices as well as systematic investible passive security (futures) based CTA indices exist. Investors should note that each CTA manager based and/or security based index series has its own approach to performance presentation, manager selection, and investment style classification; however, each generally attempts to meet a series of attributes. While there is no final agreement as to the criteria for creating such an index, for CTA indices to reflect the investment practices and index characteristics common to traditional stock and bond indices, indices should consider the following attributes:

- **Unambiguous:** CTAs included in an index and the weight assigned to each fund should be fully disclosed and readily obtainable. The factors or market strategy the index is designed to track should be explicitly defined. Guidelines for altering the components and weights should be specified in advance;
- **Investibility:** While the individual "style" indices themselves may not be directly investible, it is expected that investors will be able to earn the returns associated with the indices with minimal tracking error and at relatively low cost;
- **Measurability:** Investors will have access to the prices or returns used to compute the indices so that individual index returns can be independently verified;
- **Appropriateness**: The indices will exclude funds that a typical investor would not hold, and will employ common-sense weighting schemes and rebalancing approaches; and,
- **Accountability:** Changes in the indices' components and computation will be made by a committee whose membership is public, and will be based on established and explicitly articulated procedures.

[4] See Kritzman [1993] for the discussion on optimal currency hedging policy with biased forward rates and Spurgin (2005) for the arguments on the sources of return to managed futures.

2.2 Major CTA Indices

Manager Based

Publicly available manager based CTA indices can be broadly classified into two categories: Non-investible manager based (active) indices and Investible manager based (active) indices. The non-investible manager based indices are generally constructed by major database providers from managers reporting to their respective databases. It is important to point out that none of these non-investible manager based CTA indices completely represent the universe of CTAs and that while the various databases may contain similar managers some managers only report to a single database (See Exhibit 2). In contrast, investible manager based indices are generally constructed from a smaller set of managers who report directly to the index provider and are often based on managed accounts in contrast to pooled investment vehicles. In fact, the criteria used by various database providers to create non-investible indices or by investible CTA platform providers to construct these indices may vary widely and can be summarized as follows:

- **Selection Criteria**: Decision rules that determine which CTAs are included in the index. Examples of selection criteria include length of track record, assets under management, and restrictions on new investment;
- **Style Classification:** How each CTA is assigned to a style-specific index, and whether or not a fund that fails to satisfy the style classification methodology is excluded from the index;
- **Weighting Scheme:** The weight a particular fund's return is given in the index. Common weighting schemes are equally weighted and dollar-weighted based on assets under management; and,
- **Investibility:** Whether the index directly or indirectly investible.

For some in the CTA industry, concerns over the previously mentioned index criteria are understandable. If one uses the aforementioned standards for CTA strategy based (e.g., peer group) indices then none of the non-investible and few currently available investible manager based peer group indices are true indices, such that perhaps the term benchmarks may be a better descriptor.

[5] Other examples of individuals willing to pay to reduce risk are those who buy insurances. Insurance firms obtain a positive return to risk investment from individuals wishing to hedge various risks.

Investible Passive Security (Futures) Based CTA Indices

For a number of CTA strategies there exists passive investible security (futures) based indices. These indices have been created to have return characteristics reflective of the corresponding non-investible and/or investible manager based CTA indices. Given that these investible indices are designed to reflect the performance of manager based CTA strategies, investible security based CTA indices are generally trendfollowing, since discretionary CTAs would, by the vary nature, be difficult to track in a systematic manner.

Exhibit 2: Representation of Universe of Managers of Public Databases

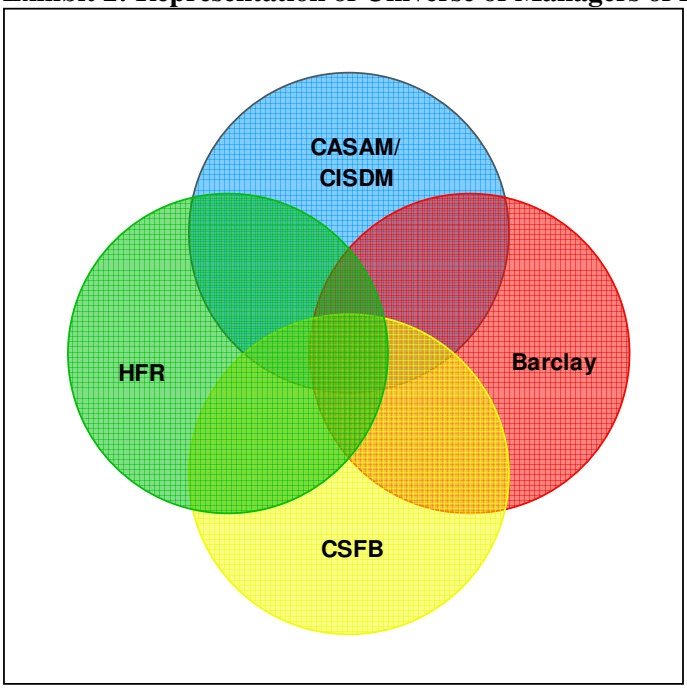


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Exhibit 3: Comparison of Existing CTA Indices

Major Non-Investible and Investible Active Manager and Passive Security Based CTA Indices											
	Non-Investible CTA Indices						Investible CTA Indices			Passive CTA Indices	
	CASAM/CISDM		Barclay Trader Index CTA	CSFB / Tremont	Calyon Financial Barclay	BTOP50	S&P Managed Futures	CSFB / Tremont INVX	FTSE CTA / Managed Futures	MLM	MSFB
Weighting	Equal	Asset	Equal	Asset	Equal	Equal	Equal	Asset	Multiple Criteria	Multiple Criteria	Multiple Criteria
Data Availability	2001	1992	1987	2003	2000	2003	2002	2003	2004	1988	2003
Strategy Classifications	7	7	6	None	None	None	None	None	None	3	3
Updates	Monthly	Monthly	Monthly	Monthly	Daily	Monthly	Daily	Monthly	Daily	Monthly	Daily
Constituency Disclosed	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Security Based	Security Based

2.3 CTA Strategy Indices

The term 'managed futures' is broad in that it encompasses a variety of different CTA strategies. CTAs are generally grouped within two primary types of trading strategies; discretionary or systematic. Within each of the generic forms of trading, managers may trade particular market segments such as currency, financial, physical commodity and equity.

Trading Strategy Focus

- **Discretionary:** Trade financial, currency, and commodity futures/options based on a wide variety of trading models including those based on fundamental economic data and/or individual trader's beliefs.
- **Systematic:** Trade primarily in the context of a predetermined systematic trading model. Most systematic CTAs follow a trend-following program although some trade countertrend. In addition, trend following CTAs may concentrate on short-, mid-, or long-term trends or a combination thereof.

Futures Markets Traded

- **Currency:** Trade currency futures/options and forward contracts.
- **Diversified:** Trade financial futures/options, currency futures/options and forward contracts as well as commodity futures/options.
- **Financial:** Trade financial futures/options as well as currency futures/options and forward contracts.
- **Physical:** Trade OTC and exchange-traded futures and/or options in energy, agricultural, and metals markets.
- **Equity:** Trade OTC and exchange-traded futures and/or options in equity-related markets.

Non-Investible Active Manager Based CTA Indices

Non-investible indices form the largest set of CTA indices. Principal CTA non-investible manager based indices include the Barclay BTOP 50 Index, CASAM/CISDM CTA Indices, Barclay CTA Index, CSFB/Tremont Managed Futures Index and Calyon Financial Barclay Index. Characteristics of each of the indices differ are as follows:

- **CASAM/CISDM:** The CASAM/CISDM Indices are a set of asset-weighted and equally-weighted indices. Indices span various market segments such as currencies, financials and diversified as well as trading strategies such as systematic or discretionary. The CASAM/CISDM Hedge Fund/CTA Database is used to select managers for the various indices. The indices are updated monthly with historical index values dating back to 1979.

- **Barclay Group:** The Barclay Group Indices are a set of equally-weighted indices. Indices span various market segments such as currencies, financials and diversified as well as trading strategies such as systematic or discretionary. The Barclay Group CTA Database is used to select managers for the various indices. The indices are updated monthly with historical index values dating back to 1987. In addition, to CTA indices derived from the Barclay CTA database, Barclay also provides two additional indices which represent returns to the overall CTA Universe.

- **Calyon Financial/Barclay Index:** The Calyon Financial Barclay Index provides daily returns from a collection of major CTAs that are open to new investment. Selection of the pool of qualified CTAs

used in construction of the Index is conducted annually, with re-balancing on January 1st of each year. The index is equal weighted and updated daily. The index was launched in 2000 and is updated monthly.

- **Barclay BTOP 50 Index:** The BTOP50 Index attempts to replicate the overall composition of the managed futures industry in terms of both trading style and overall market exposure. The BTOP50 employs a top-down approach in selecting its constituent CTAs. The largest investible trading advisor programs, as measured by assets under management, are selected for inclusion in the index. Selected trading advisor programs represent, in aggregate, no less than 50% of the investible assets of the Barclay CTA Universe each year. The index was launched in 2003 and is updated monthly.

- **Credit Suisse/Tremont Managed Futures Index:** The Credit Suisse/Tremont Managed Futures Index is an asset weighted index based on funds reporting to the TASS database. Unlike CISDM or the Barclay Group, Credit Suisse/Tremont does not provide indices for various market segments or strategies. The TASS Database is used to select managers for this index. The indices are updated monthly with historical index values dating back to 1994.

2.5 Manager Based Investible CTA Indices

In addition to manager based non-investible CTA indices manager based investible CTA indices are also available. The principal manager based investible indices include the S&P Managed Futures Index, the CSFB/Tremont INVX and the FTSE Hedge CTA/Managed Futures index. Characteristics of each index are as follows:

- **S&P Managed Futures Index (S&P MFI):** The S&P MFI is an equally-weighted investible index designed to be representative of investments in managed futures/CTAs programs. Specifically, the index aims to track systematic managers employing mainly technical trend following and pattern-recognition trading methodologies. The index is updated daily and was launched in 2002. Currently, the S&P Managed Futures Index is not offered as an investment product.

- **Credit Suisse/Tremont Managed Futures INVX Index:** The Credit Suisse/Tremont Managed Futures INVX Index is an asset weighted index based on eligible investible funds reporting to the TASS database. The TASS Database is used to select managers for this index. Eligible funds must have a minimum of $50 million in assets under management with a track record greater than 12 months. The index is reviewed and rebalanced semi-annually. The index was launched in 2004.

- **Other Manager Based CTA Indices:** There are several other investible manager based CTA indices such as the FTSE Hedge CTA/Managed Futures Index.. Each of these indices differs as to selection methodology, weighting scheme and style classification.[6]

[6] We have not included the MSCI systematic CTA indices in this study due to its more heterogeneous nature which includes more global macro players.

2.6 Investible Passive CTA Indices

Like other security based investible indices (e.g., S&P 500), CTA passive security based indices are based on a systematic approach index creation and reflect a particular approach to futures/option trading with the goal of replicating the underlying return stream to the particular CTA trading strategy. For instance, the MLM Index™ is based a particular trendfollowing model of futures prices for a basket of actively traded futures contracts consisting of commodities, global bonds and currencies. Other passive investible CTA indices such as the MFSB provide CTA indices also that attempt to generate returns similar to certain types of trend-based strategies (Spurgin, Schneeweis, and Georgiev, 2003).

2.7 Issues in CTA Benchmark design

Since each benchmark index differs to some extent in the methodology in which they are constructed, it is important to understand some of the potential problems and limitations that can become a factor in the design of an appropriate CTA benchmark. These potential problems are as follows:

Data Issues: If one uses a current database to construct one's own index, that index may contain selection, backfill or survivorship bias. When a public database is used as a basis for index calculation, the public index return data before the index inception date may also contain backfill and survivorship bias.

- **Selection Bias:** This type of bias exists in most indices. It arises from the selection methodologies used by the index provider to select funds in the index. Selection bias can exist in various forms (e.g., if funds are asset weighted, the index is impacted by larger funds whereas if funds are equal weighted the index is impacted by funds with higher volatilities).

- **Backfill Bias:** Since managers typically voluntarily report their results to benchmark index provider this can present issues that impact the performance of such benchmarks and can potentially provide a misleading representation of the true performance of the industry or strategy being presented. A manager may elect to begin submitting his or her returns to an index only when their results appear favorable. Most of the major CTA indices only have limited backfill bias since for many have been in existence since the early 1990 and only in the initial month of reporting are new managers part of the index. In practice, backfill bias is difficult to estimate since certain managers may start reporting to newer databases at any point in time.

- **New Manager Bias:** New managers often have fewer assets under management and may trade more concentrated portfolios. As a result their performance may not reflect larger mature managers. To eliminate the upward bias resulting from potential new manager bias, index providers typically discard the first 12 to 24 months of reported returns in calculating their indices or required a particular amount of assets under management.

- **Survivorship Bias:** This bias exists when one creates a CTA index from a current data base that includes only those managers who have survived over time. This leads to an upward bias in benchmark index reporting since it does not take into account those managers who performed poorly and have ceased operating or reporting. Most of the major CTA indices have no survivorship bias since they have been in existence since the early 1990 in that they do not restate their historical index return data when managers stop reporting.

Weighting: The methodology in which an index is weighted can have a significant impact on the interpretation of the performance of an underlying index.

- **Asset versus Equal Weighting**: Asset weighted indices place proportionately greater emphasis on the returns on larger CTAs when computing their index performance. This can be an issue in benchmark design since an asset weighted index suggests the performance of those CTAs in the index with the highest assets under management better represents the performance of the given benchmark. This methodology is more firm-specific than industry specific. Equal weighted indices do not present any size-related bias since each fund is given equally proportional weighting in the calculation of the benchmark index.

Manager Selection: Constructing a CTA index entails selecting a set of managers that are intended to be representative a larger universe of CTAs. Determining the process for choosing managers, ensuring those managers reflect the intended composite or strategy index being constructed, and deciding the appropriate number of managers for inclusion into the index all present issues in index construction.

- **Fund Composite/Strategy Listing:** Defining the CTA universe is a difficult exercise. There is no general agreement regarding which investment strategies should be presented or the weights that should be used in determining the performance of such a composite index. As a result, most investible indices are constructed at the strategy level, such that the historical pattern of returns may be expected to reflect future performance characteristics.

- **Number of Funds/Managers**: There is no single number of managers required for an index to represent a particular strategy. However, academic research has shown that approximately four to six CTAs are required to represent a particular CTA strategy. One issue of importance however is the degree to which the managers in the index are equal or asset weighted. A strictly asset weighted approach may weight the index towards a single group of managers such that diversification within the strategy may be reduced. In addition, if the managers within the index have dramatically different volatilities, the manager with the highest volatility will dominate the return movement of the index.

- **Manager Selection Process:** Most indices rely on a set of published quantitative measures as well as a qualitative oversight approach to manager selection. The quantitative approaches may differ across strategies, however, they are used to create a set of managers, which generally trade in similar areas and are sensitive to similar economic factors.

3. Empirical Analysis

3.1 Data and Methodology:

For any particular investor, the fundamental basis for using a particular CTA index or benchmark is that it should have similar trading and market factor characteristics to the corresponding CTA or CTA strategy under consideration. In this analysis we provide information on the various trading and market factor characteristics of a wide range of alternative CTA non-investible manager based, investible manager based, and investible passive security (futures) based) indices. It is important to point out, the CTA indices reflect the performance of a portfolio of CTAs. Therefore, similar to stock indices and individual stocks, while the returns of a CTA index may be reflective of the expected returns of a specific CTA, in a particular strategy the risk estimate for an index will generally be less than any individual CTA.

Our analysis consists of using monthly return data for investible and non-investible active manager based CTA indices as well as investible passive security based CTA strategy indices for the period January 2001 through September 2006. It is important to note that several of the non-investible and investible manager indices used in this study were created post January 2001. To the degree that survivorship bias and/or selection bias exists in these indices prior to their date of creation those returns may be upward bias. For the purposes of our study, the indices created from the major databases, CISDM, Barclay, and CFSB are not affected by survivorship or backfill bias. However, the BTOP50, S&P, FTSE, CSFB investible manager based indices were created post January 2001 and may contain a degree of manager selection or backfill bias in their returns between January 2001 and their date of creation. Similarly, the MSFB index was relaunched in 2001 and to the degree that the passive systematic trendfollowing model was based on data in 2001, the returns from the period of testing may result in upward bias returns for that period (Spurgin et. al, 2003).

Lastly, there has been considerable discussion as to the alternative means of determining a CTA's alpha. As previously discussed, CTAs have been described as skill-based investment strategies. Academic research has demonstrated CTA returns are in part driven systematically by market factors such as changes in momentum, rather than exclusively by individual manager's alpha. In brief, one can think of CTA returns as a combination of manager skill and an underlying return to the CTA strategy or investment style itself. Therefore, in order to claim alpha one should be able to depict a return in excess of an equally risky and equally investible CTA investment strategy. The use of the risk free rate, or an S&P 500 based CAPM while investible does not reflect similar risk to a CTA. As such, a CTA's excess return based on them should not be considered an example of manager skill. Similarly, the use of return based on an assumed Sharpe ratio or non-investible multi-factor model should not be considered an example of a manager's alpha, but only his or her excess return relative to that individual risk measure.[7]

In short, while many CTAs continue to compare themselves with Treasury bill returns, the S&P 500, or even returns based on an expected Sharpe ratio, the actual excess return of a CTA after considering a wider range of comparable risky assets is often close to zero (see Exhibit 4). This is not to say that CTAs do not provide value, only that the returns to CTAs are commensurate with the underlying risks to which they are exposed. For instance, the source of CTA returns may be due to risks from a variety of market

[7] In fact, one can use a number of performance measures to test the relative return performance of CTAs (Hedgequest, 2005). As discussed previously, for instance, CTAs were once described as absolute return vehicles since their return was supposedly uncorrelated with any traditional index. If a CTA's equity beta was close to zero, then the comparison benchmark return was the risk-free rate. Current academic research has shown, however, that such simple 'CAPM' based measures of return performance often under specify the CTA's expected risk and therefore the CTA's expected return.

factors (e.g., trading processes) which provides an example of a multi-factor benchmarks model for CTA strategies (see Exhibit 5). A similar sensitivity by certain CTA strategies to stock and bond markets or to common trading processes would reflect their sensitivities to common market factors. In brief, the sensitivity of various CTA strategies to various return factors is based on their similar risk exposure.

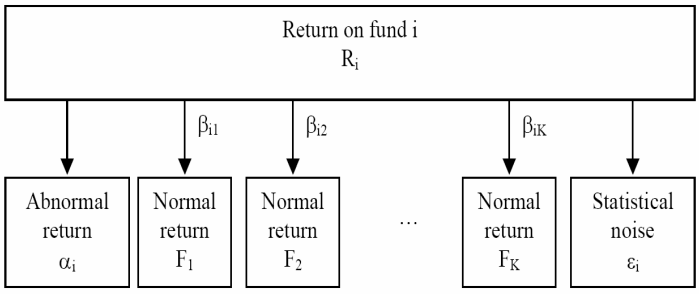
Exhibit 4: Excess Return/Alpha Determination Based on Single- and Multi-Factor Benchmarks [8]

Benchmark Comparisons			
Excess Return Alpha Determination			
Market Based:	**Benchmark**	**Computation**	**Calculation**
	T-Bill	Ri-Rf	5.00%
	CAPM	Ri-(Rf+(Rm-Rf)*Bi)	4.50%
	Expected Sharpe Ratio: (Variance)	(Historical return-Expected Return from Sharpe Ratio =.66)	2.00%
	Multi-Factor	Ri-(B1*R1(S&P 500) + …+ BN*RN(Lehman High Yield)+…)	4.50%
Security (Futures) Based:	Strategy Replication (Passive)	Ri-(Passive futures based replicating strategy)	0.50%
Relative Performance Determination			
Manager Based:	**Benchmark**	**Calculation**	**Assumption**
	Indices	Ri -(Investible and Non-investible Index Ri)	2.00%
	Peer Group	Ri-(Strategy Based Peer Group Ri)	1.00%

Exhibit 5: Multi-factor Regression Format

$R_i = \alpha_i + \beta_{i,1} F_1 + \ldots \beta_{i,K} F_K + e_i$

Where:
- Ri = Return on fund *i*
- α_i = Abnormal Return (or Alpha) for portfolio *i*
- $\beta i,1$ = Beta Coefficient of fund *i* for Market Factor *K or* Trading Factor K
- F_K = Return on Market Factor *K*
- e_i = Statistical Noise of fund *i*



[8] The various measures of excess return described in this exhibit do not consider the required return to increase the Sharpe ratio of a stand alone portfolio. As shown in Anson (2006), when considering the required return for an asset to be added to an existing portfolio for that asset to increase the Sharpe ratio of the existing portfolio one should also consider the correlation of the security in question to the existing portfolio. Given the low equity and bond betas for most CTAs, the results using this approach would be similar to the results using a CAPM or Jensen measure.

In this analysis we also use several investible security (futures) CTA strategy based measures of return estimation. To the degree that the measures fully represent comparable investible returns, such tradable alternatives provide a means to measure manager alpha. Additionally, a set of non-investible and investible manager based CTA indices are used to offer a means of relative peer return comparisons. However, peer group based relative return estimates are not measures of 'absolute' manager skill but only relative manager skill.

In order to focus on the relative impact of various potential benchmarks, we also estimate the benchmark based excess return comparison detailed in Exhibit 4 above to 77 CTAs within the CASAM/CISDM database with full monthly return data for the January 2001 to September 2006 time period. These CTAs are grouped based on the CASAM/CISDM investment strategy/market classifications (discretionary, systematic, currency, diversified, and financial). The CTAs are also classified into short, medium, long and multiple time frames based on the time period used in their trading decision model (e.g. systematic trendfollowing CTAs). By categorizing CTAs into these trading time classifications, we then compare the average performance of these CTAs to determine the impact of alternative trading time classifications on the use of current CTA manager based benchmarks on measuring excess returns. In this study, we will focus on the impact of using short, medium, long and multiple trading time frames on diversified and financial CTAs where our sample of funds was large enough to break out into smaller sub-groups. Lastly, since the 77 CTAs were determined for the December, 2006 CASAM/CISDM data base, the managers selected contains both survivorship and backfill bias and the reported return level are expected to be above indices based on all CTAs existing over the period used for analysis.

4. Empirical Results

In this section, the historical performance, market factor characteristics and relative return comparisons of the CTA indices are reviewed. We first analyze the performance of both investible and non-investible active manager based CTA strategy indices as well as investible passive security based CTA strategy. Secondly, we review the correlation of the various CTA benchmarks on a range of market factors and comparison non-investible managers based indices, investible manager based indices, and investible passive security based indices. Lastly, we analyze the relative performance of various manager based CTA indices and sample CTAs on across a range of previously discussed CTA benchmarks.

4.1 Industry Level Results

Non-Investible CTA Indices

Exhibit 6a depicts the return performance, market factor correlations and benchmark comparisons of non-investible CTA indices for the period of January 2001 through September 2006. During this period, all of the major industry level non-investible CTA indices reported a range of annualized returns and volatility levels. For instance, the CSFB/Tremont Managed Futures index has both the highest return (6.74%) and the highest standard deviation (12.49%), while the Barclay Traders index had the lowest return (4.70%) and the lowest standard deviation (7.92%). This wide deviation in return and risk is indicative of differences in index construction (e.g., the CSFB is asset weighted and the Barclay indices is equal weighted) that may lead to wide differences in return for seemingly similar index representations.

A comparison of non-investible CTA indices to major market factors shows these indices to consistently have a negative correlation with both equity and high yield debt markets; however, a weak positive correlation is found to exist between the CTA indices and the Lehman U.S. Government Credit Index. These CTA indices are highly correlated with both investible and non-investible manager based indices as evidenced by their correlations to the CASAM/CISDM and S&P indices. With correlations of approximately 0.70 to the MFSB Composite Index and approximately 0.50 to the MLM Composite Index, non-investible CTA indices are moderately correlated to strategy based CTA indices. In brief, little difference in relative return movement or market factor sensitivity seems to exist among the major providers of industry level manager benchmarks.

Exhibit 6a also shows how benchmark excess return estimates differ for non-investible CTA indices. As expected, the T-Bill benchmark results in the highest excess returns for all CTA indices when compared to other benchmarks. Given the low betas that exist for CTAs, the results for using the T-Bill benchmark are somewhat similar to that of the CAPM. However, when total risk is considered with an assumed required Sharpe ratio of 0.66, all the various indices indicated a negative excess return performance.

Exhibit 6a depicts the difference in excess return estimates that are obtained using both market and manager/futures based benchmarks. Compared to Sharpe based differential excess return, the greater market based excess return is indicative of the benefits of CTAs when considered as a diversification tool in contrast to standalone investment vehicle. However, the lower excess return (and high correlation) which results from the use of passive futures based indices relative to a market based excess return estimate also indicates that simple market based models of return estimate may underspecify the true

strategy return process of the underlying CTA strategies. In brief, results show that the excess return or peer group estimates can be significantly impacted by the benchmark by which they are calculated Graphical representation of the results in Exhibit 6a are presented in Exhibits 6b though 6e.

Exhibit 6a: Performance and Benchmark Comparisons of Non-Investible CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
CASAM/CISDM CTA Asset Weighted Index	6.53%	7.98%	0.50	-8.25%	-0.03	-0.37
CASAM/CISDM CTA Equal Weighted Index	6.40%	8.51%	0.46	-8.75%	0.20	-0.32
CSFB/Tremont Managed Futures	6.74%	12.49%	0.34	-13.92%	-0.09	-0.33
Barclay Trader Indexes CTA	4.70%	7.92%	0.28	-7.74%	0.12	0.03
Calyon Financial/Barclay Index	6.12%	9.39%	0.39	-10.30%	-0.15	0.54
Btop 50	6.20%	9.78%	0.38	-10.92%	-0.05	0.13
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations						
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLM Composite Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index
CASAM/CISDM CTA Asset Weighted Index	-0.17	0.34	-0.10	0.52	0.71	1.00	0.93
CASAM/CISDM CTA Equal Weighted Index	-0.24	0.33	-0.16	0.49	0.74	0.95	0.94
CSFB/Tremont Managed Futures	-0.25	0.34	-0.16	0.52	0.69	0.97	0.95
Barclay Trader Indexes CTA	-0.24	0.35	-0.18	0.49	0.74	0.95	0.95
Calyon Financial/Barclay Index	-0.24	0.31	-0.16	0.49	0.72	0.96	0.93
Btop 50	-0.27	0.35	-0.17	0.50	0.72	0.96	0.95
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.19	-0.23	-0.17	-0.32
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.26	0.21	0.34	0.35
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.04	-0.21	-0.10	-0.21

	Benchmark (Excess Return) Comparison of Non-Investible CTA Indices: 2001-9/2006						
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible	Manager Based - Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLM Composite Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index
CASAM/CISDM CTA Asset Weighted Index	4.03%	-1.24%	2.12%	4.33%	1.03%	0.00%	2.10%
CASAM/CISDM CTA Equal Weighted Index	3.89%	-1.72%	1.98%	4.19%	0.90%	-0.13%	1.97%
CSFB/Tremont Managed Futures Index	4.23%	-4.01%	2.32%	4.53%	1.23%	0.20%	2.31%
Barclay Trader Indexes CTA Index	2.19%	-3.04%	0.28%	2.49%	-0.81%	-1.84%	0.27%
Calyon Financial/Barclay Index	3.62%	-2.58%	1.71%	3.92%	0.62%	-0.41%	1.70%
Btop 50 Index	3.69%	-2.76%	1.78%	3.99%	0.70%	-0.33%	1.77%

Exhibit 6b: Descriptive Statistics of Non-Investible CTA Indices

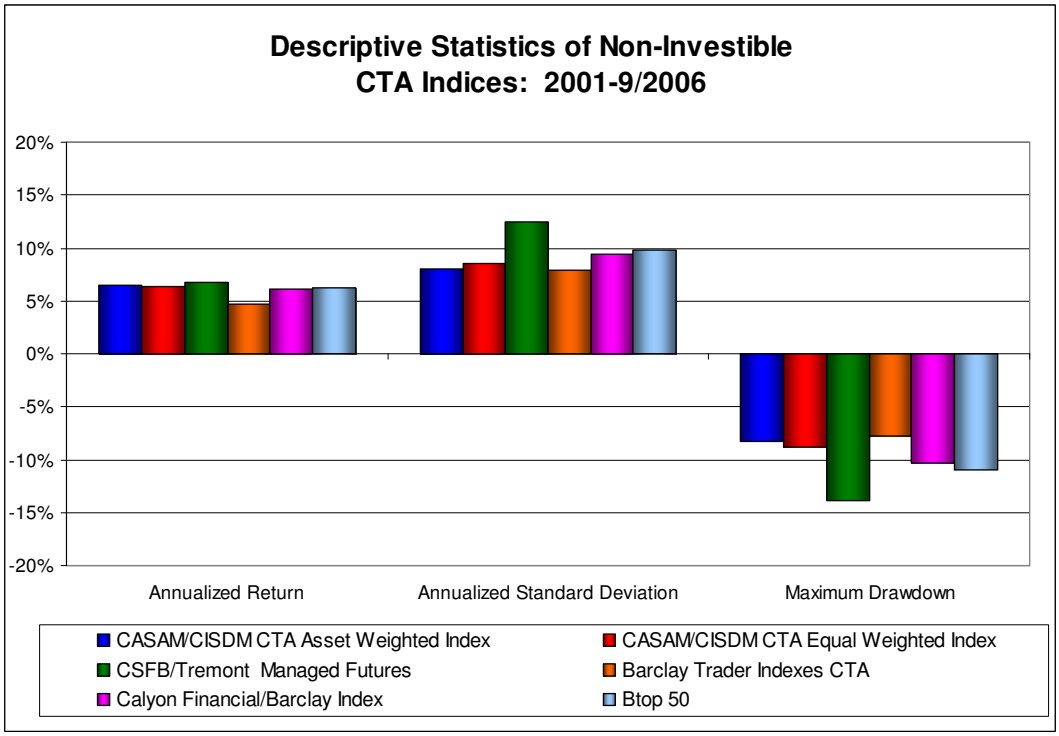


Exhibit 6c: Market Factor Correlations of Non-Investible CTA Indices

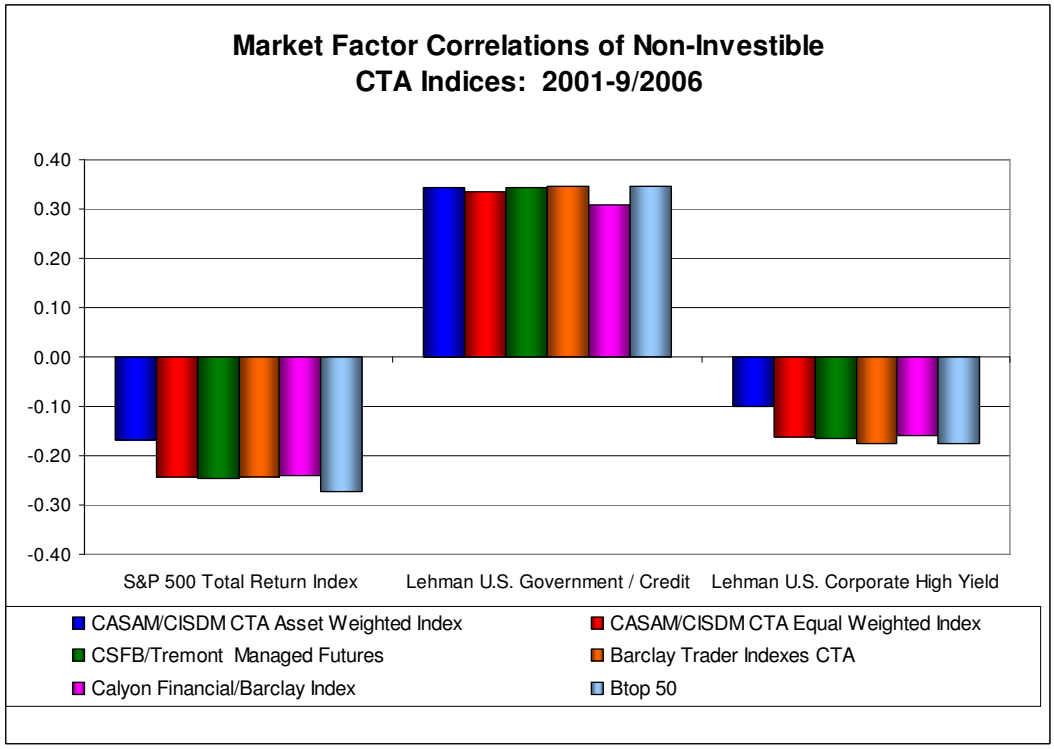


Exhibit 6d: Security and Manager Based Correlations of Non-Investible CTA Indices

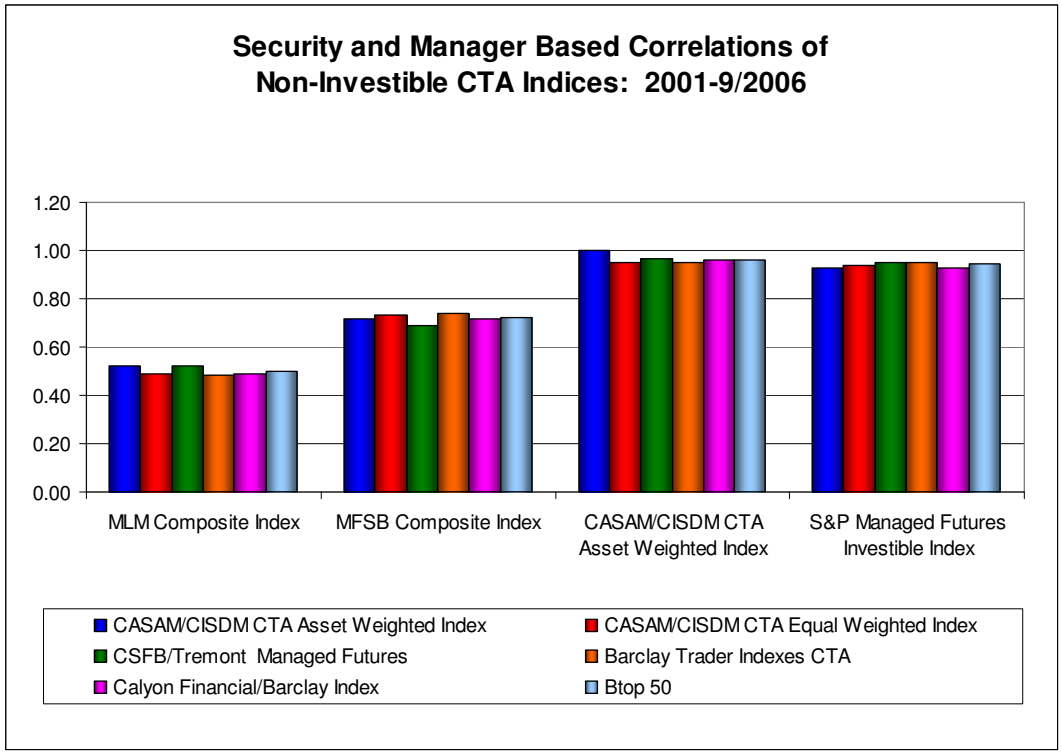
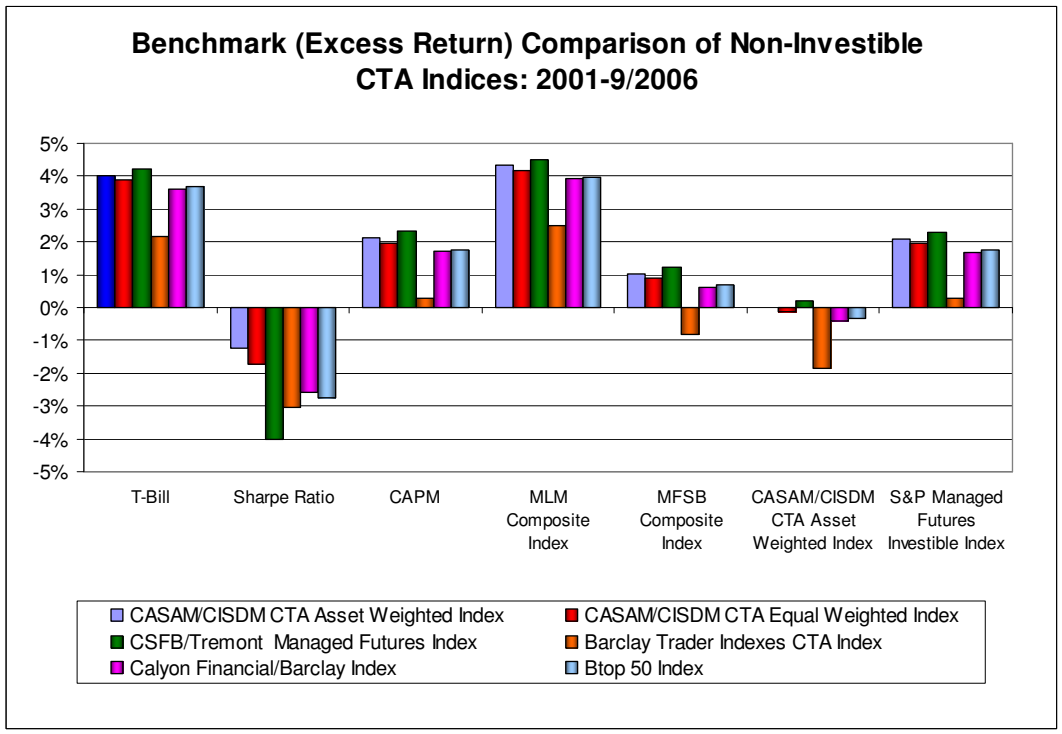


Exhibit 6e: Benchmark (Excess Return) Comparison of Non-Investible CTA Indices



Investible Manager Based CTA Indices and Investible Passive Security (Futures) Based CTA Strategy Indices

Most of the major CTA benchmark indices are not directly investible. As such, they fail to reflect the actual performance of investible alternatives. Exhibit 7a depicts the return performance, market factor correlations and benchmark comparisons of investible manager and security based CTA indices for the period of January 2001 through September 2006. Over the period of analysis, S&P Managed Futures Index return/standard deviation (4.43%/15.63%) was lower than comparable investible manager based CTA indices; FTSE CTA/Managed Futures (7.73%/14.64%), CSFB/Tremont (6.98%/12.82%). The higher returns for the FTSE and CSFB returns may be in part due to the later date of their creation. As such their historical return may contain a degree of backfill and survivor bias that results in their upward return bias relative to the S&P CTA index. Comparing the performance of non-investible manager based CTA indices, and investible manager based CTA indices (S&P managed futures), the excess peer returns were higher when the investible manager index was used. This is due in part to the relatively low returns of the S&P managed futures index compared to other investible CTA alternatives. Exhibit 7a depicts the return performance and market factor correlations of passive investible security based CTA indices. Of the two representative security based CTA indices (MLM and MFSB), both indices had similar risk sensitivity and market factor correlations as the investible manager based CTA indices. Moreover, for the period of analysis, the MFSB index has similar return and risk characteristics as well as peer group correlations to the investible manager based indices.[9]

Exhibit 7a also shows how benchmark excess return estimates differ for investible CTA indices. When total risk is considered, with an assumed required Sharpe ratio of 0.66, all the various indices indicated a negative excess return performance. As previously noted, given the low S&P based betas that exist for CTAs, the results for using the market factor based excess returns (CAPM) are similar to the T-Bill benchmark. As shown for non-investible manager based CTA indices, comparing the performance of investible CTA indices to other non-investible manager based indices, investible manager based CTA indices, and investible passive security based indices results in excess return estimates that vary by index provider. Investible CTA indices had higher excess returns relative to the MLM Composite strategy based index and lower excess returns compared to the MFSB Composite index. One reason for the different returns of the two representative passive investible CTA indices is that the MFSB index uses a range of 'moving average time frames' in determining its trading whereas the MLM is primarily long

[9] The MFSB program is not currently offered in a publicly available form. The return estimates, however, are all out of sample and reflects both a 50 basis point internal trading cost and a 50 basis point management fee. For purposes of disclosure, one of the authors of this paper has a direct investible interest in the MFSB program.

term in nature. Thus the two security based benchmarks used in this analysis differ in benchmark construction. Excess returns of investible CTA indices or the MFSB Composite Index as well as comparable investible and non-investible manager based indices are generally less than those obtained when using absolute return based (T-Bill) and market factor based (CAPM) benchmarks. Again, these results show that the excess return estimates can be significantly impacted by the index in which they are calculated. Graphical representations of the results found in Exhibit 7a are presented in Exhibits 7b though 7e.

Exhibit 7a: Performance and Benchmark Comparisons of Investible CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Active Manager Based						
S&P Managed Futures Investible Index	4.43%	15.63%	0.12	-17.84%	-0.07	-0.41
FTSE CTA/Managed Futures	7.73%	14.64%	0.36	-16.67%	0.33	-0.29
CSFB/Tremont INVX Managed Futures	6.49%	13.27%	0.30	-16.53%	-0.16	-0.25
CSFB/Tremont SECT Managed Futures	6.98%	12.82%	0.35	-15.62%	-0.01	-0.12
MSCI Hedge Invest Systematic Trading index	3.94%	6.97%	0.21	-10.92%	0.03	0.06
Security Based						
MLMCITR Index	2.21%	6.35%	-0.05	-8.94%	0.33	2.41
MFSB Composite	5.50%	10.65%	0.28	-15.00%	0.07	1.37
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations						
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLM Composite Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index
Active Manager Based							
S&P Managed Futures Investible Index	-0.32	0.35	-0.21	0.53	0.71	0.93	1.00
FTSE CTA/Managed Futures	-0.24	0.32	-0.14	0.52	0.69	0.91	0.91
CSFB/Tremont INVX Managed Futures	-0.28	0.31	-0.18	0.52	0.67	0.94	0.93
CSFB/Tremont SECT Managed Futures	-0.32	0.32	-0.20	0.49	0.72	0.95	0.95
Security Based							
MLMCITR Index	-0.19	0.26	-0.04	1.00	0.12	0.52	0.53
MFSB Composite	-0.23	0.21	-0.21	0.12	1.00	0.71	0.71
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.19	-0.23	-0.17	-0.32
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.26	0.21	0.34	0.35
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.04	-0.21	-0.10	-0.21

	Benchmark (Excess Return) Comparison of Investible CTA Indices: 2001-9/2006						
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible	Manager Based - Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLM Composite Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index
S&P Managed Futures Investible Index	1.92%	-8.39%	0.01%	2.22%	-1.08%	-2.10%	0.00%
FTSE CTA/Managed Futures Index	5.22%	-4.44%	3.31%	5.52%	2.22%	1.20%	3.30%
CSFB/Tremont INVX Managed Futures Index	3.98%	-4.78%	2.07%	4.28%	0.98%	-0.05%	2.06%
CSFB/Tremont SECT Managed Futures Index	4.47%	-3.99%	2.56%	4.77%	1.47%	0.44%	2.55%

Exhibit 7b: Descriptive Statistics of Investible CTA Indices

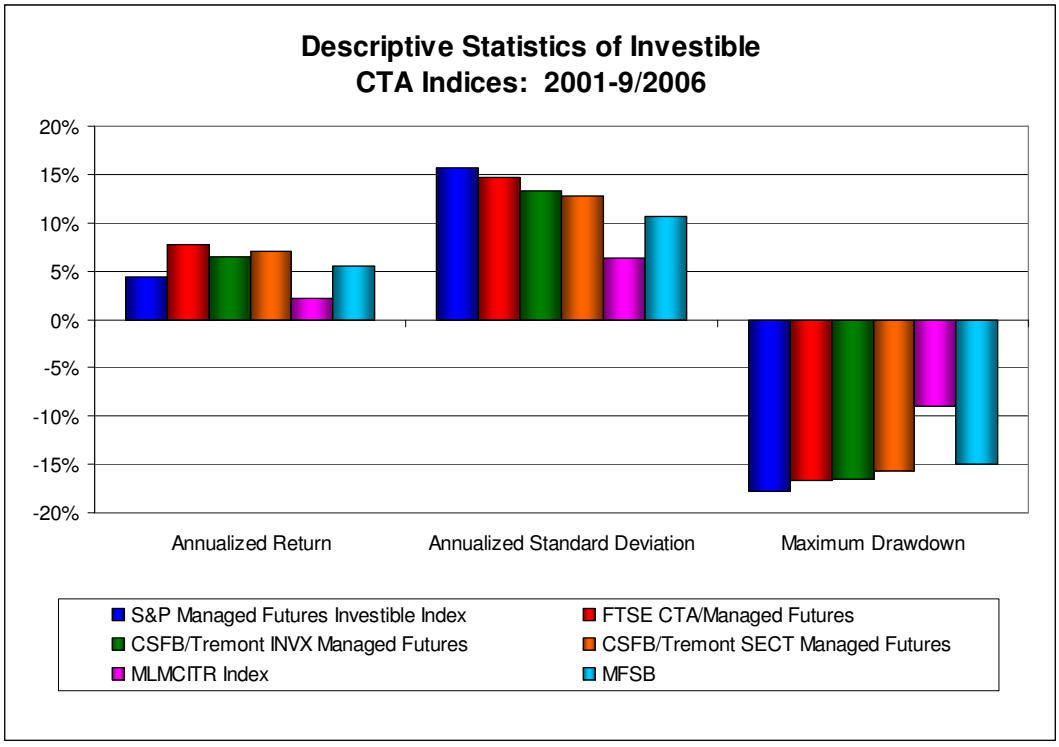


Exhibit 7c: Market Factor Correlations of Investible CTA Indices

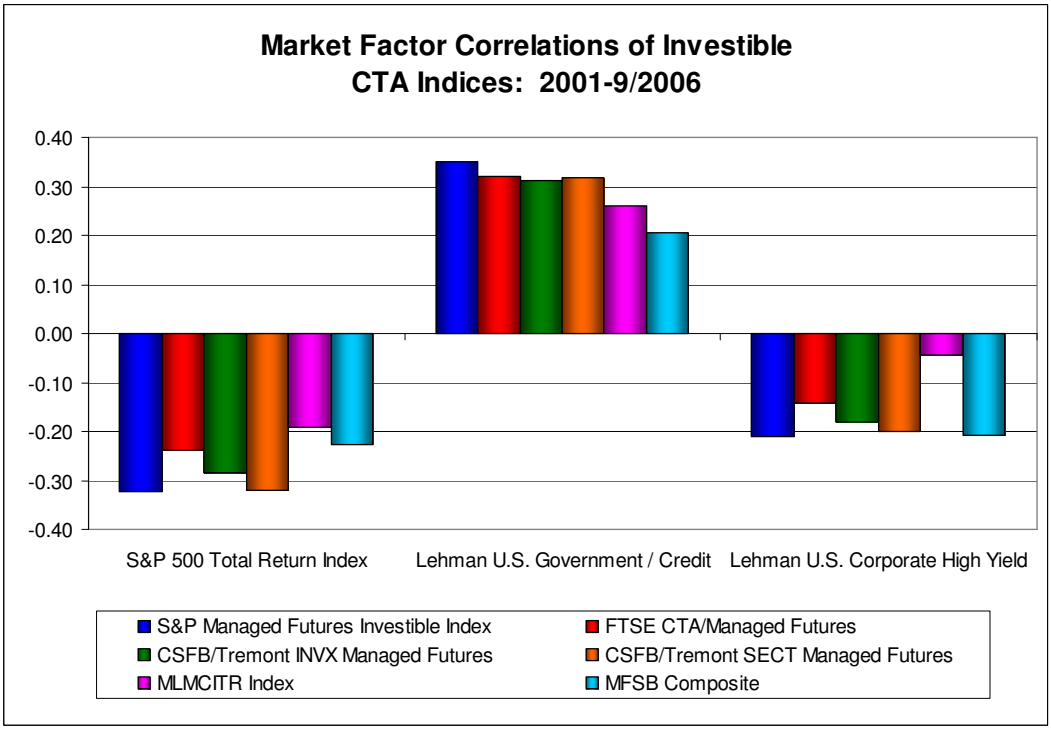


Exhibit 7d: Security and Manager Based Correlations of Investible CTA Indices

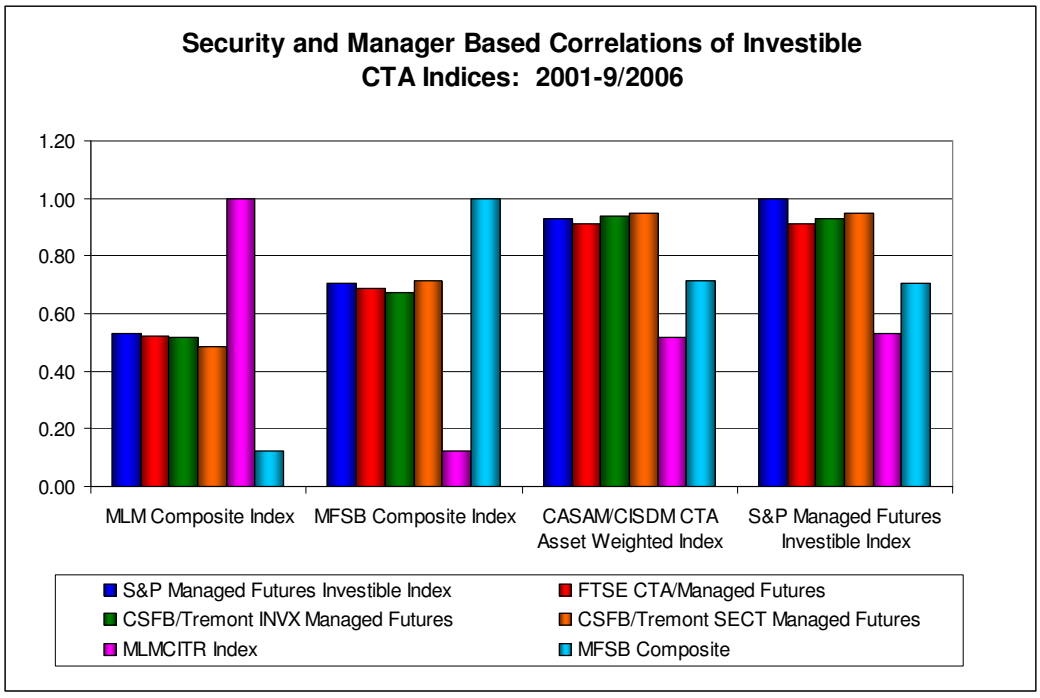
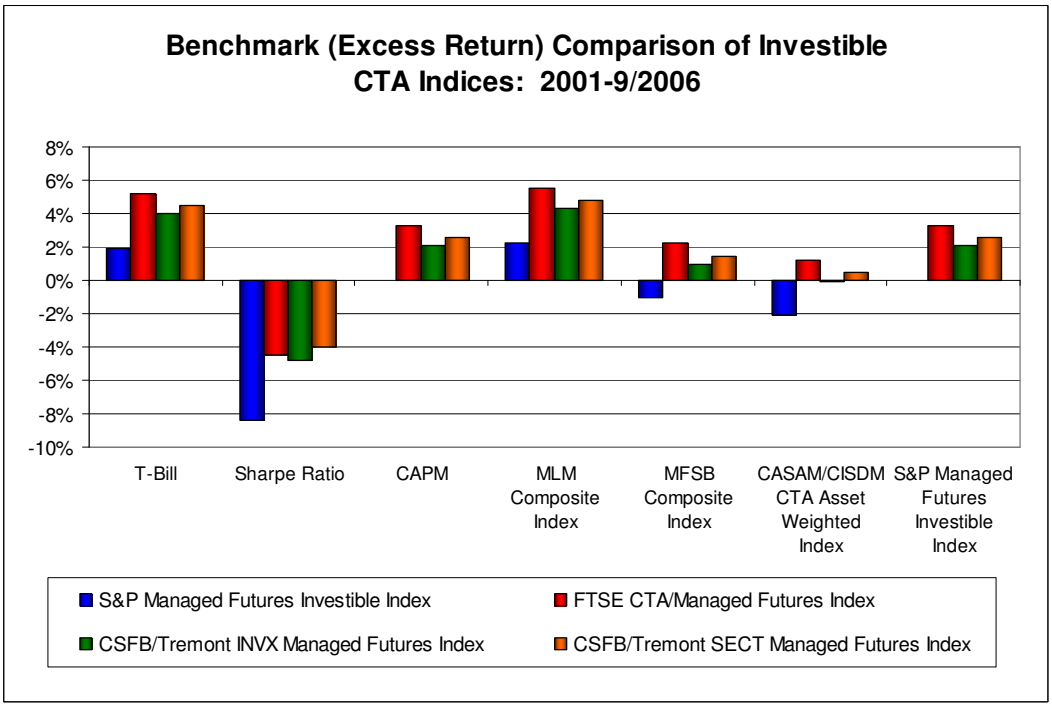


Exhibit 7e: Benchmark (Excess Return) Comparison of Investible CTA Indices



4.2 Strategy Index Level Results

While the previous section reviewed benchmark performance at the overall index level, individual CTAs should be analyzed within their relative strategy grouping. In this section, we review some of the performance characteristics, market factor correlations, and benchmark return comparisons for a range of CTA strategies (e.g., currency, financial, diversified).

Currency CTAs

Exhibit 8a: Performance and Benchmark Comparisons of Currency CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Currency Index	2.66%	6.36%	0.03	-9.74%	0.12	-0.32
CASAM/CISDM CTA Equal Weighted Currency Index	5.29%	6.11%	0.45	-7.37%	0.96	0.85
Barclay Trader Indexes Currency	3.22%	6.22%	0.11	-6.61%	1.13	1.47
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCFXTR Index	5.14%	5.83%	0.45	-5.06%	0.30	0.49
MFSB Currency	0.96%	22.27%	-0.07	-35.33%	1.03	0.71
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

			Correlations			
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLMCFXTR Index	MFSB Currency Index	CASAM/CISDM CTA Asset Weighted Currency Index
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Currency Index	0.26	0.13	0.28	0.56	0.55	1.00
CASAM/CISDM CTA Equal Weighted Currency Index	-0.10	0.14	-0.09	0.62	0.79	0.60
Barclay Trader Indexes Currency	-0.04	0.21	-0.06	0.72	0.82	0.64
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCFXTR Index	0.04	0.22	0.03	1.00	0.58	0.56
MFSB Currency	-0.03	0.06	-0.06	0.58	1.00	0.55
S&P 500 Total Return Index	1.00	-0.31	0.52	0.04	-0.03	0.26
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.22	0.06	0.13
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	0.03	-0.06	0.28

	Benchmark (Excess Return) Comparison of Currency CTA Indices: 2001 - 9/2006					
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLMCFXTR Index	MFSB Currency Index	CASAM/CISDM CTA Asset Weighted Currency Index
CASAM/CISDM CTA Asset Weighted Currency Index	0.16%	-4.04%	-1.75%	-2.48%	1.70%	0.00%
CASAM/CISDM CTA Equal Weighted Currency Index	2.78%	-1.25%	0.87%	0.14%	4.32%	2.62%
Barclay Trader Indexes Currency	0.71%	-3.39%	-1.20%	-1.92%	2.25%	0.55%

Exhibit 8b: Descriptive Statistics of Currency CTA Indices

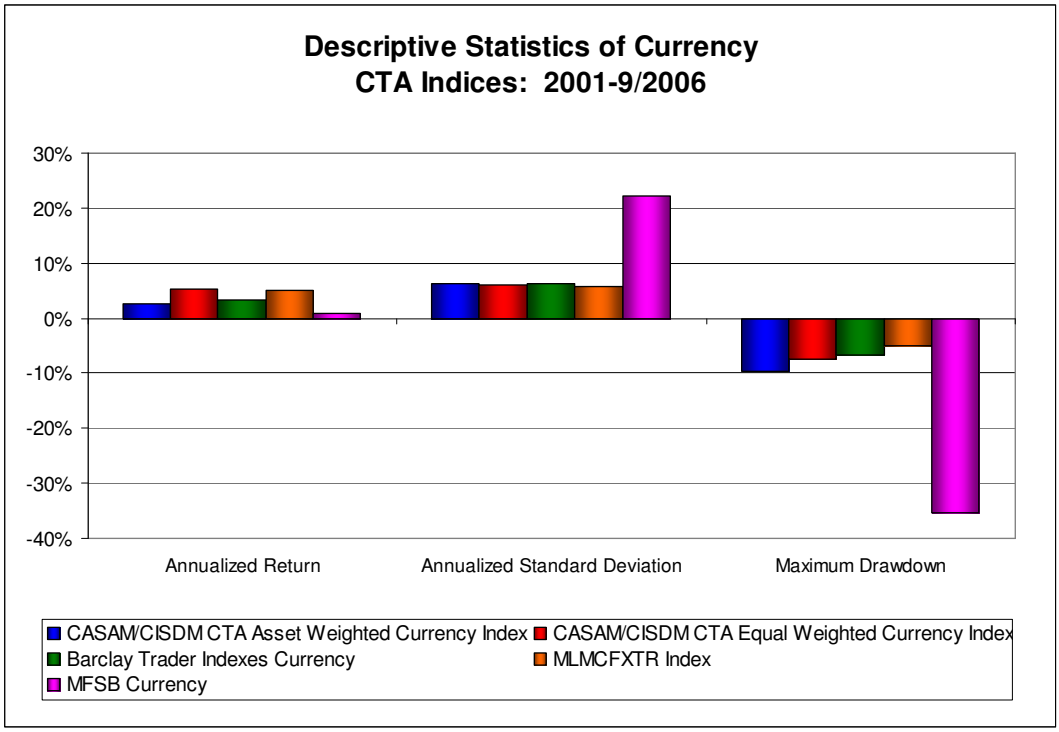


Exhibit 8c: Market Factor Correlations of Currency CTA Indices

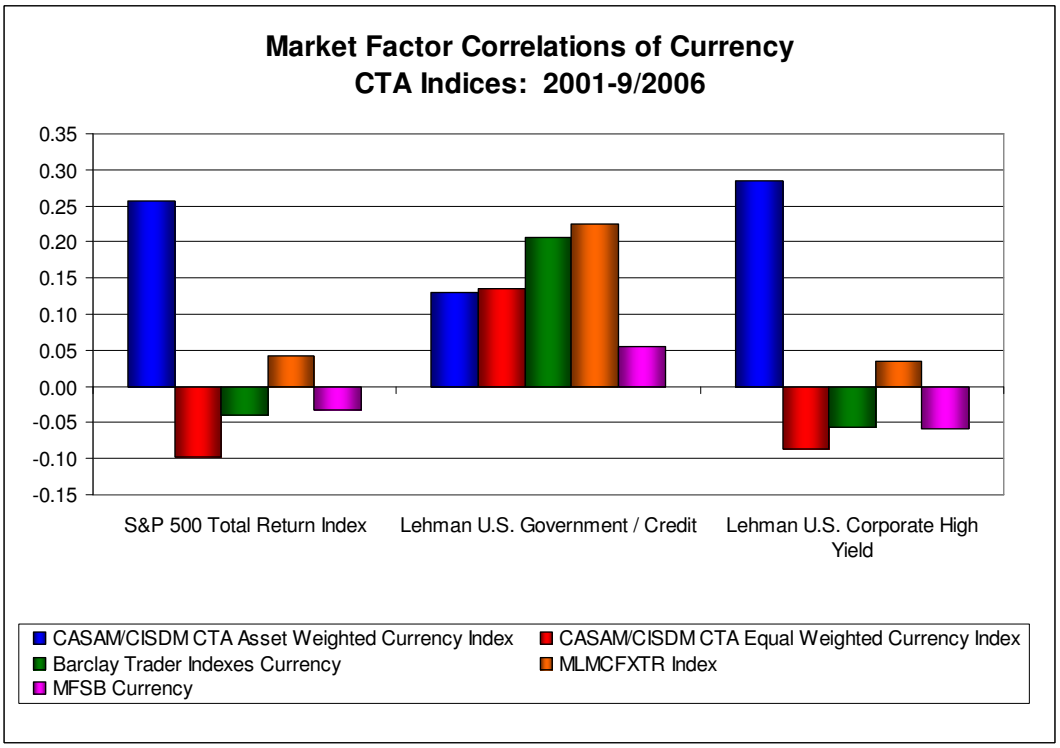


Exhibit 8d: Security and Manager Based Correlations of Currency CTA Indices

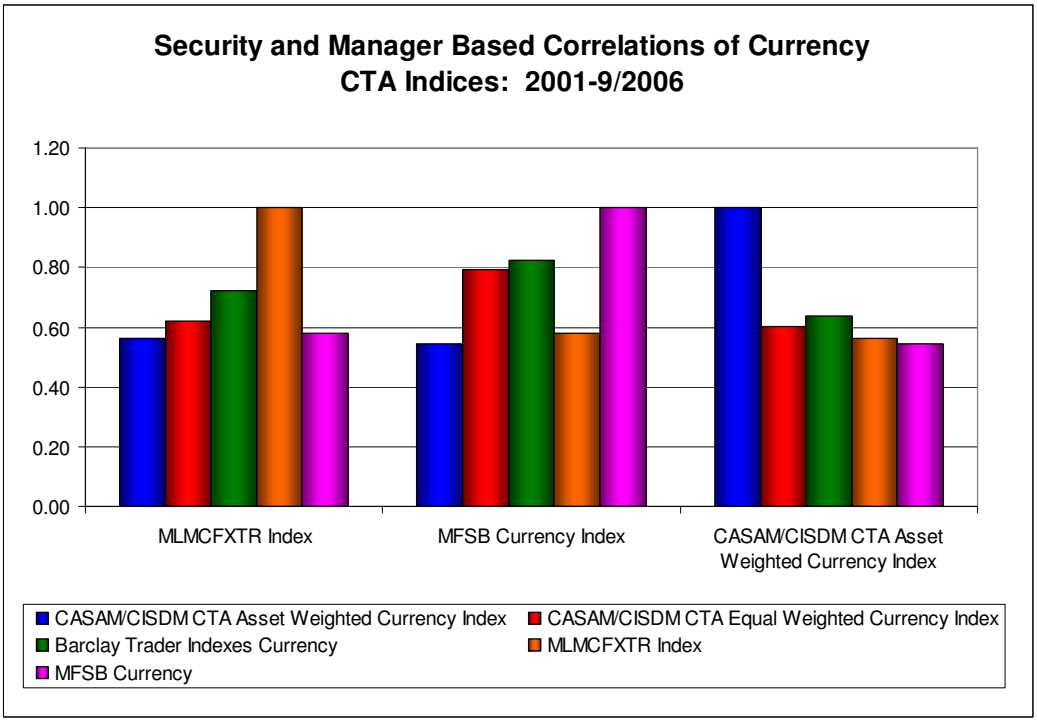


Exhibit 8e: Benchmark (Excess Return) Comparison of Currency CTA Indices

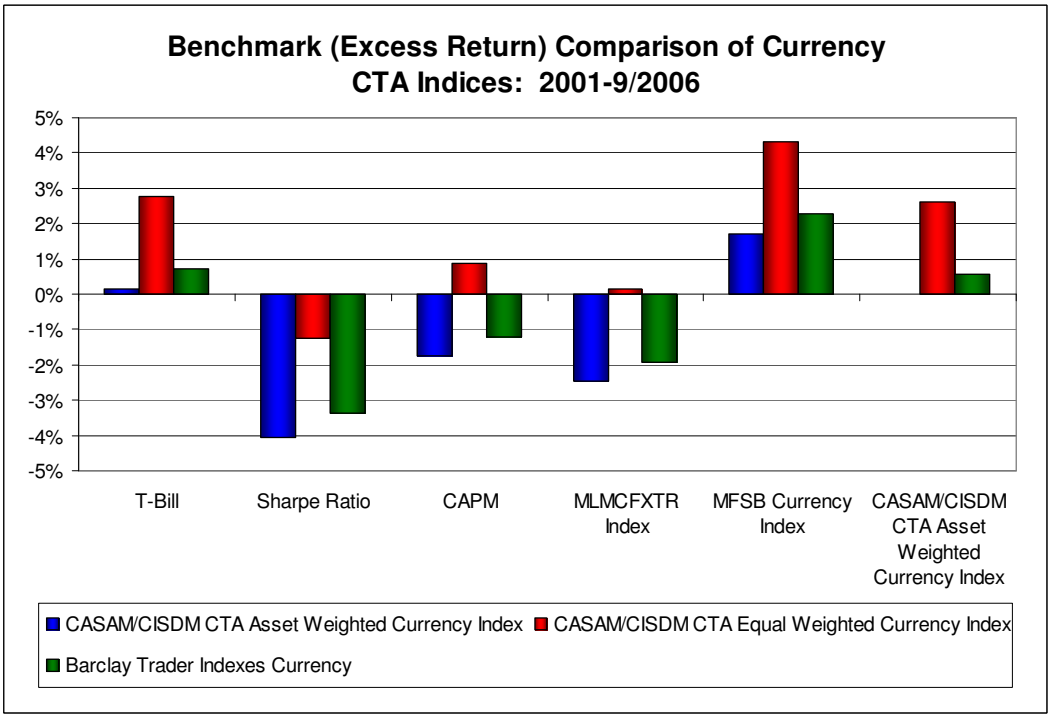


Exhibit 8a shows the return performance, correlations, and benchmark comparisons of non-investible manager based and investible security based currency CTA indices. There exists little public information on investible manager based benchmarks at the CTA Currency strategy level. The various non-investible currency CTA indices performed similarly during the period with annualized returns ranging between 2.66% and 5.29% and standard deviations ranging between 6.11% and 6.36%, respectively. Conversely, while the investible security based MLM Currency Index had a risk/return profile similar to that of non-investible currency CTA indices, the MFSB Currency CTA Index posted a significantly lower annualized return of only 0.96% with a much higher standard deviation of 22.27%.

With the exception of the CASAM/CISDM CTA Asset Weighted Currency Index, both non-investible and security based investible CTA indices had little or no market factor correlation with the S&P 500 and Lehman High Yield indices, but had weak positive correlations with the Lehman U.S. Government/ Credit index. Currency CTA indices are shown to have higher correlations when compared relative to strategy and market based indices. This is expected given that security and market based indices are constructed using strategies or funds which trade commodity-based financial instruments, and as such, are more comparable than when comparing such CTAs to indices that are composed of traditional stock and bond asset classes.

Excess return estimates for currency CTA indices reflect results that vary based on the benchmark used. As in previous analysis, the excess return declines as one moves from an absolute return based benchmark (T-Bill), to a market factor based performance measure (CAPM), to a total risk based measure (Sharpe ratio). In this analysis, the excess returns for the non-investible indices decreases as one moves from the non-investible CTA currency index to the security based MLM Currency Index, and increases slightly as one moves from non-investible CTA currency indices to the security based MFSB Currency Index. Excess returns of non-investible currency CTA indices are found to be comparable to the absolute return and market factor based returns when compared relative to the manager based non-investible CASAM/CISDM index. These indices provide evidence that index design can have a clear impact of benchmark comparison measurements. Graphical representations of the results found in Exhibit 8a are presented in Exhibits 8b though 8e.

Financial CTAs

Exhibit 9a shows the return performance, correlations, and benchmark comparisons of both investible and non-investible financial CTA indices. Non-investible financial CTA indices incurred higher zero and risk adjusted returns over the period in comparison to investible financial CTA indices as well as the S&P 500. Financial CTAs showed some variability in terms of risk between indices with annualized standard deviations ranging between 6.57% and 13.43%. Security based financial CTA indices are also found to have incurred larger maximum drawdowns over the period in comparison to non-investible manager based financial CTA indices. All financial CTA indices were found to have negative market factor correlations with the S&P 500 and Lehman U.S. Corporate High Yield Index and were positively correlated with the Lehman U.S. Government/Credit Index. Surprisingly, the MLM Financial CTA index had a considerably higher positive correlation to the Lehman Government/Credit Index (0.67) when compared to other financial CTA indices.

Exhibit 9a: Performance and Benchmark Comparisons of Financial CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Financial Index	10.32%	10.05%	0.78	-10.25%	0.07	0.35
CASAM/CISDM CTA Equal Weighted Financial Index	6.17%	8.69%	0.42	-8.69%	0.14	-0.21
Barclay Trader Indexes Financial & Metals	5.12%	6.57%	0.40	-6.04%	0.43	0.74
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCFITR Index	2.27%	6.89%	-0.03	-14.05%	-0.66	1.14
MFSB Financial	6.02%	13.43%	0.26	-21.01%	-0.02	2.36
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations					
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLMCFITR Index	MFSB Financial Index	CASAM/CISDM CTA Asset Weighted Financial Index
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Financial Index	-0.22	0.33	-0.17	0.52	0.56	1.00
CASAM/CISDM CTA Equal Weighted Financial Index	-0.30	0.41	-0.21	0.58	0.60	0.86
Barclay Trader Indexes Financial & Metals	-0.34	0.47	-0.16	0.58	0.53	0.85
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCFITR Index	-0.32	0.67	-0.14	1.00	0.37	0.52
MFSB Financial	-0.22	0.21	-0.18	0.37	1.00	0.56
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.32	-0.22	-0.22
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.67	0.21	0.33
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.14	-0.18	-0.17

	Benchmark (Excess Return) Comparison of Financial CTA Indices: 2001 - 9/2006					
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLMCFITR Index	MFSB Financial Index	CASAM/CISDM CTA Asset Weighted Financial Index
CASAM/CISDM CTA Asset Weighted Financial Index	7.82%	1.18%	5.90%	8.05%	4.30%	0.00%
CASAM/CISDM CTA Equal Weighted Financial Index	3.66%	-2.07%	1.75%	3.89%	0.15%	-4.15%
Barclay Trader Indexes Financial & Metals Index	2.62%	-1.72%	0.71%	2.85%	-0.90%	-5.20%

Exhibit 9b: Descriptive Statistics of Financial CTA Indices

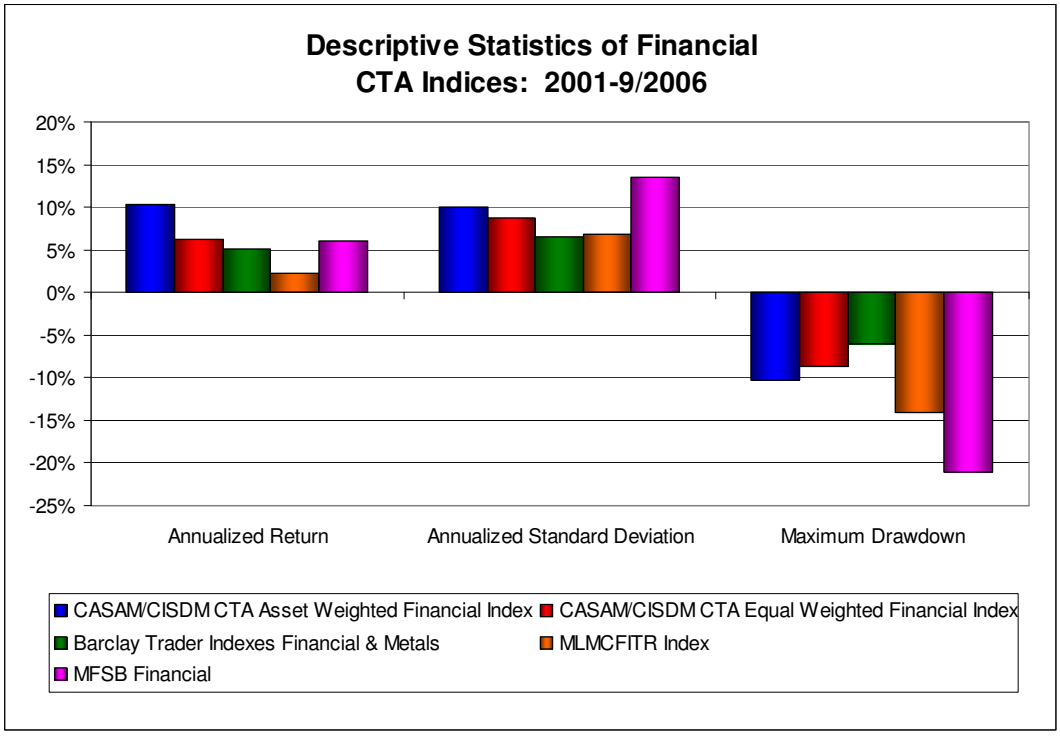


Exhibit 9c: Market Factor Correlations of Financial CTA Indices

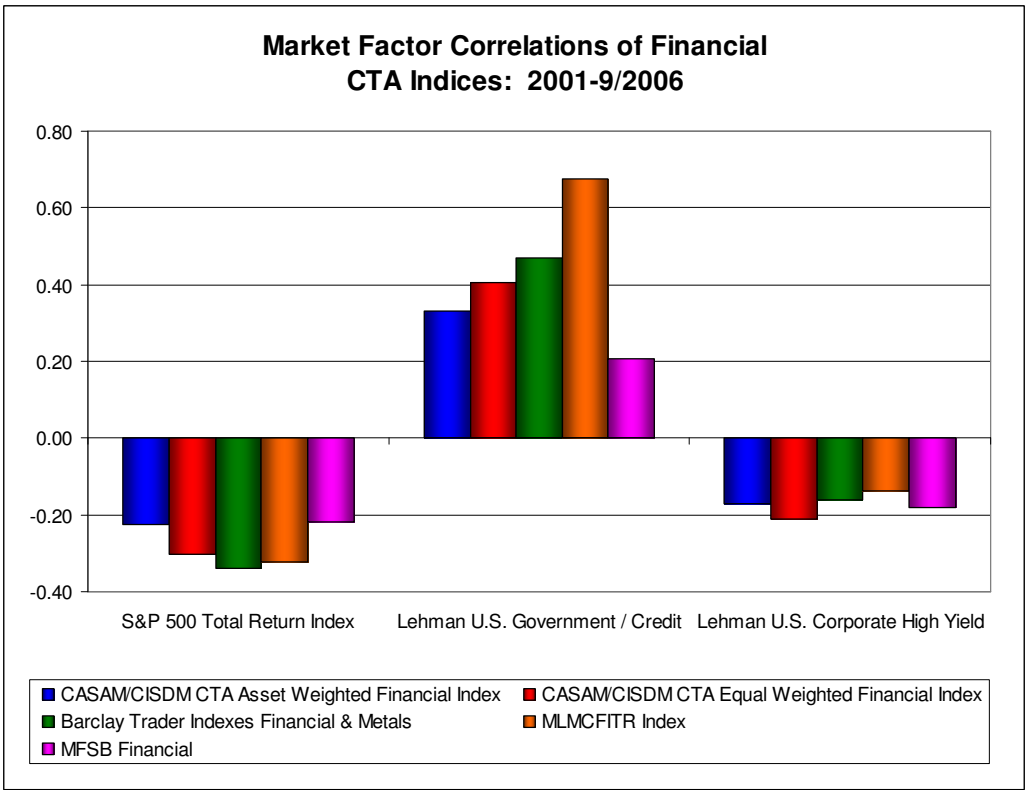


Exhibit 9d: Security and Manager Based Correlations of Financial CTA Indices

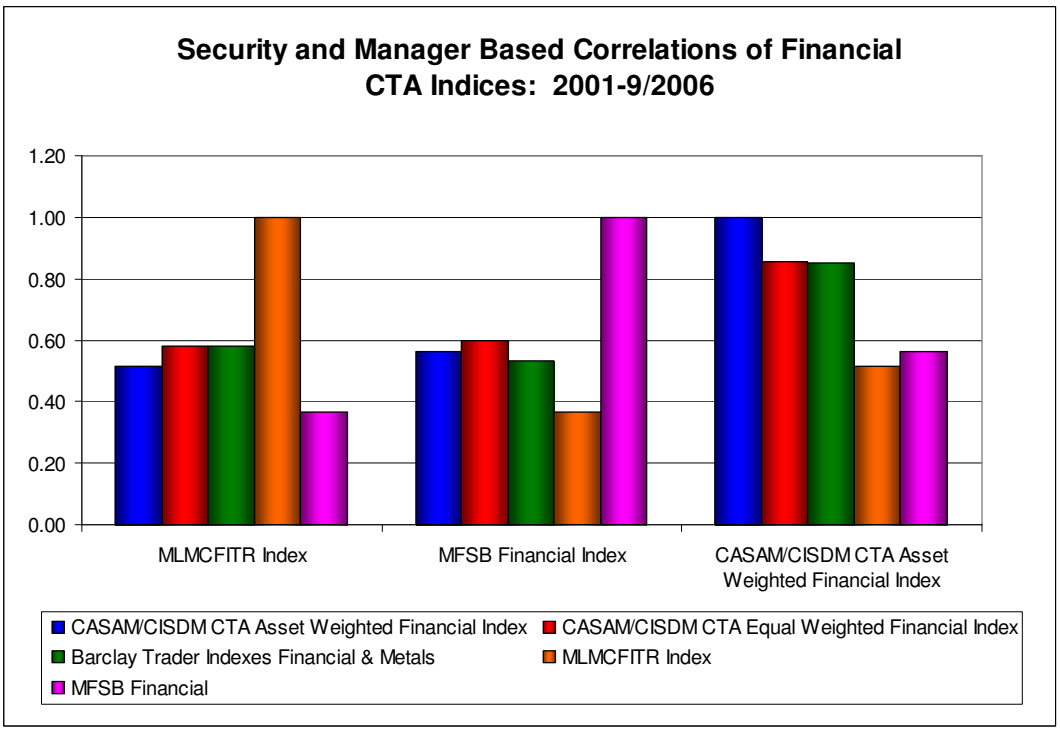
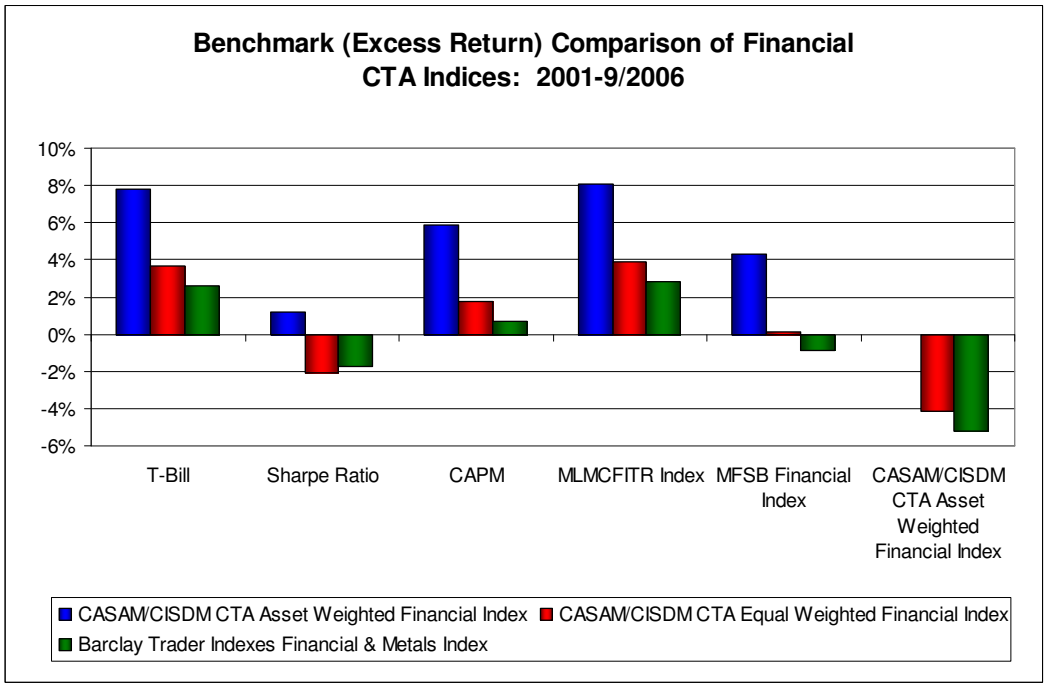


Exhibit 9e: Benchmark (Excess Return) Comparison of Financial CTA Indices



Positive correlations are found between all financial CTA indices and security and manager based indices. Financial CTA indices on average tend to be moderately correlated with the security based MLM and MFSB Financial indices with correlations of approximately 0.55. Such CTAs on average tend to have even higher correlations with the manager based CASAM/CISDM Financial index. Again, the results indicate the relative differences that exist between industry and market factor correlations among the various investible and non-investible indices. Excess return estimates for financial CTA indices fluctuate considerably across various benchmarks. However, what is significant is that with the exception of the MLM Financial Index which considerably underperformed relative to comparable financial CTA indices, the manager and security based passive indices often result in lower excess return estimates than the market based estimates. Graphical representations of the results found in Exhibit 9a are presented in Exhibits 9b though 9e.

Diversified CTAs

Exhibit 10a below shows the return performance, correlations, and benchmark comparisons of investible composite and non-investible diversified CTA indices. During the period, non-investible diversified CTA indices considerably outperformed the MLM Composite index while performing in line with the MFSB Composite index. Risk-adjusted returns of both investible composite and non-investible diversified CTA indices underperformed major traditional asset class indices except for the S&P 500. Consistent with previous findings, market factor correlations of diversified CTA indices with the S&P 500 and Lehman U.S. Corporate High Yield Index are negative and positive with the Lehman U.S Government Credit Index. Diversified CTA indices are found to be moderately correlated with strategy based MLM and MFSB Composite indices and have an even higher correlation with the manager based non-investible CASAM/CISDM CTA Asset Weighted Diversified Index.

Lastly, excess returns for some diversified CTA indices are found to fluctuate considerably but follow similar patterns shown in previous strategy examples. Using market factor based benchmarks, the excess return declines as one moves from an absolute based return (T-Bill) to a market based performance measure (CAPM), to a total risk measure (Sharpe ratio). As expected, excess returns shrink when diversified CTA indices are compared relative to the peer group, non-investible CASAM/CISDM CTA Asset Weighted Diversified Index. Graphical representations of the results found in Exhibit 10a are presented in Exhibits 10b though 10e.

Exhibit 10a: Performance and Benchmark Comparisons of Diversified CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Diversified Index	5.69%	9.19%	0.35	-11.36%	-0.06	-0.70
CASAM/CISDM CTA Equal Weighted Diversified Index	7.18%	10.76%	0.44	-11.37%	0.06	-0.40
Barclay Trader Indexes Diversified	5.32%	11.40%	0.25	-11.96%	0.01	-0.17
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	2.21%	6.35%	-0.05	-8.94%	0.33	2.41
MFSB Composite	5.50%	10.65%	0.28	-15.00%	0.07	1.37
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations					
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Diversified Index
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Diversified Index	-0.18	0.30	-0.11	0.54	0.67	1.00
CASAM/CISDM CTA Equal Weighted Diversified Index	-0.24	0.33	-0.14	0.50	0.71	0.96
Barclay Trader Indexes Diversified	-0.25	0.33	-0.18	0.50	0.72	0.96
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	-0.19	0.26	-0.04	1.00	0.12	0.54
MFSB Composite	-0.23	0.21	-0.21	0.12	1.00	0.67
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.19	-0.23	-0.18
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.26	0.21	0.30
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.04	-0.21	-0.11

	Benchmark (Excess Return) Comparison of Diversified CTA Indices: 2001 - 9/2006					
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Diversified Index
CASAM/CISDM CTA Asset Weighted Diversified Index	3.18%	-2.88%	1.27%	3.48%	0.18%	0.00%
CASAM/CISDM CTA Equal Weighted Diversified Index	4.68%	-2.42%	2.77%	4.98%	1.68%	1.50%
Barclay Trader Indexes Diversified	2.81%	-4.71%	0.90%	3.11%	-0.18%	-0.37%

Exhibit 10b: Descriptive Statistics of Diversified CTA Indices

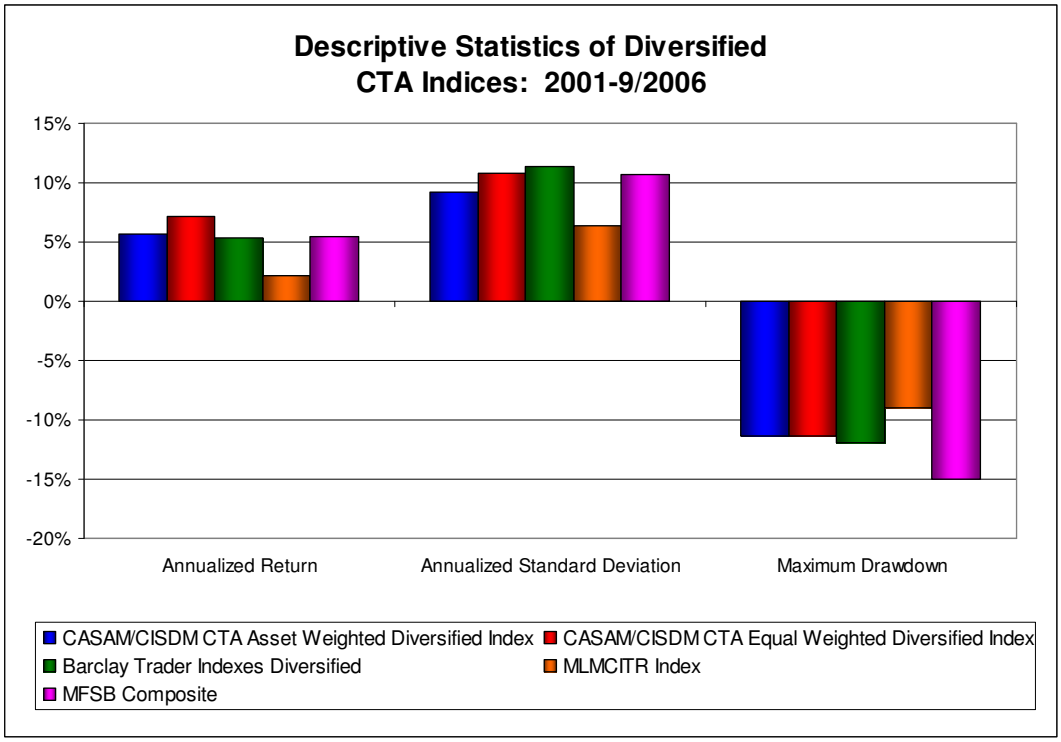


Exhibit 10c: Market Factor Correlations of Diversified CTA Indices

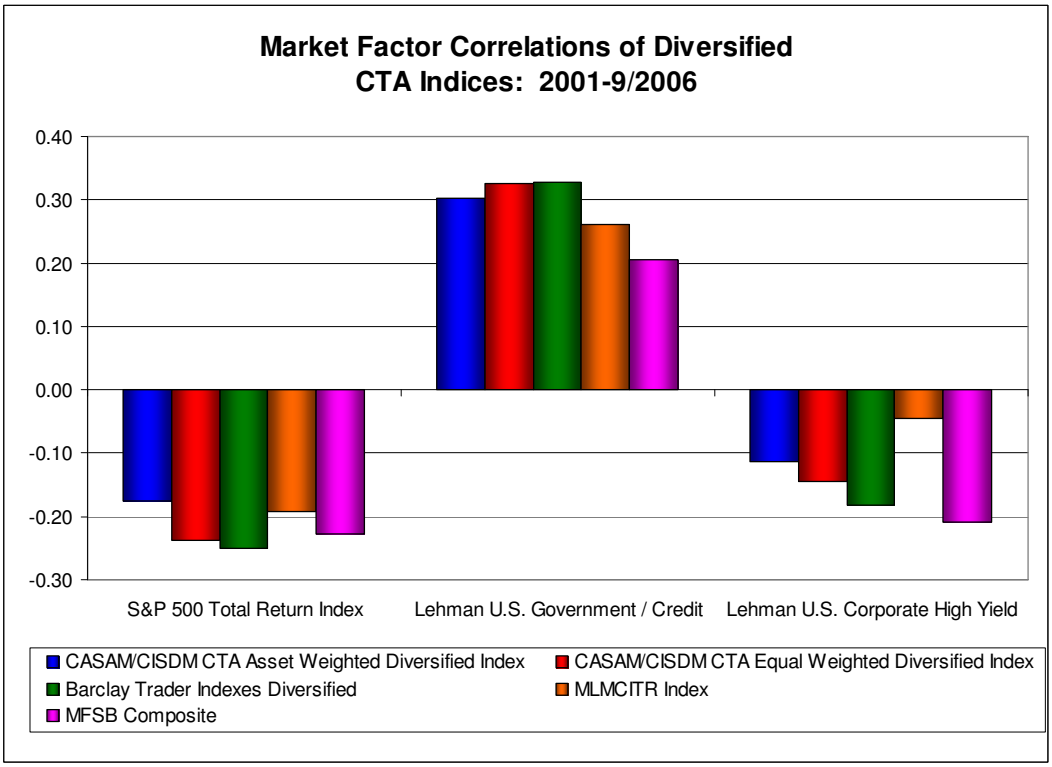


Exhibit 10d: Security and Manager Based Correlations of Diversified CTA Indices

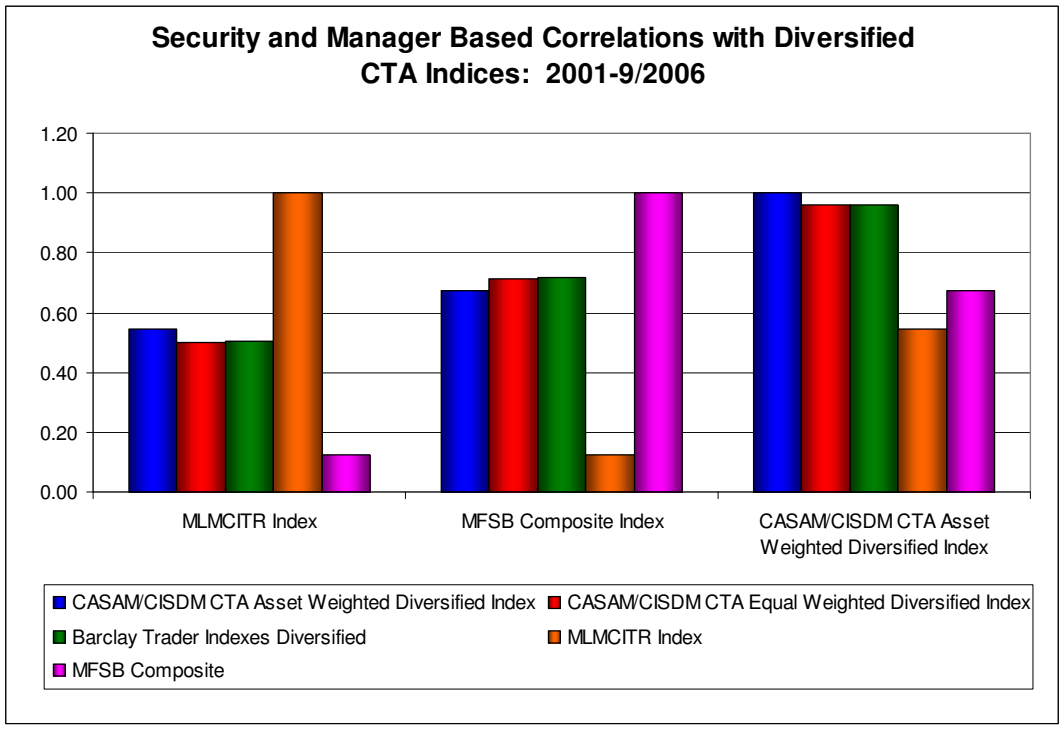
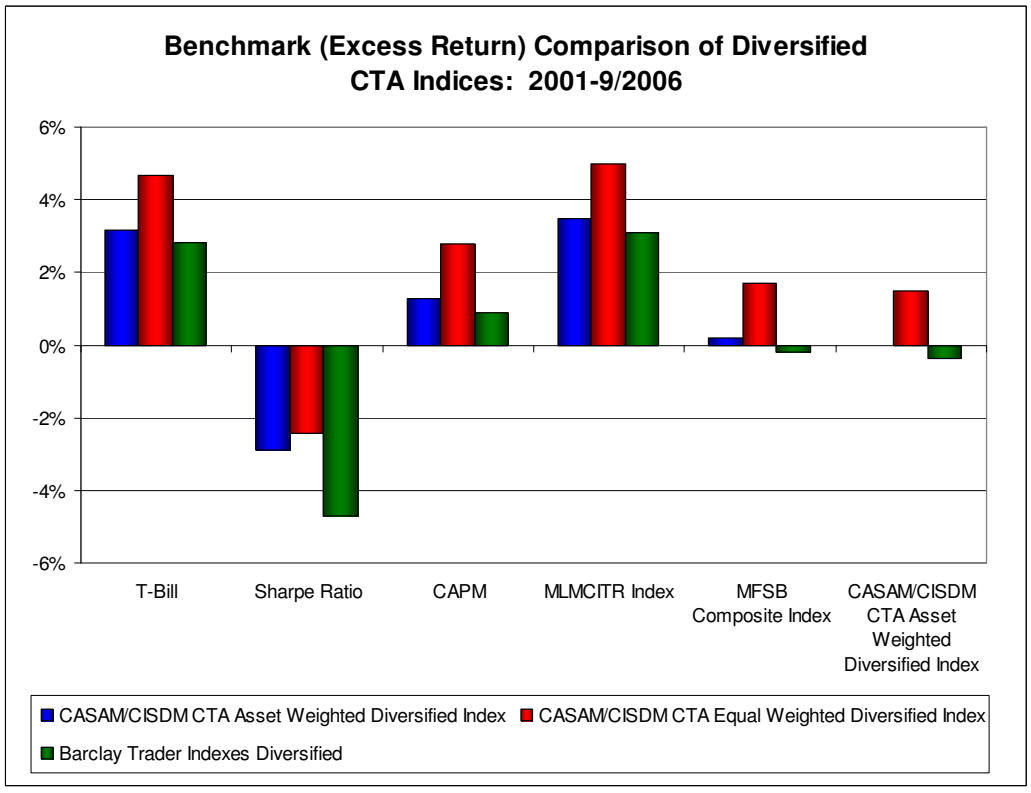


Exhibit 10e: Benchmark (Excess Return) Comparison of Diversified CTA Indices



Discretionary CTAs

Exhibit 11a shows the return performance, correlations, and benchmark comparisons of non-investible discretionary and investible composite CTA indices. Discretionary CTA indices are by the very nature of their construction difficult to benchmark. During the period, non-investible discretionary CTA indices incurred higher absolute and risk adjusted returns as well as markedly lower maximum drawdowns than security based investible composite CTA indices and traditional asset classes. As indicated in Exhibit 11a, there is a relatively lower correlation between the CASAM/CISDM index and other non-investible discretionary indices. This is consistent with the lack of homogeneity within the discretionary trading strategy area. Given their relatively low standard deviations compared to other CTA strategies, the relative differences between absolute return based (T-Bill), market factor based (CAPM), and total risk based (Sharpe ratio) benchmark metrics are less than that exhibited among other CTA indices. As expected, the manager based non-investible discretionary CTA indices may provide a reasonable peer group alternative. In this case of discretionary CTAs, no investible futures based index currently exists. Graphical representations of the results found in Exhibit 11a are presented in Exhibits 11b though 11e.

Exhibit 11a: Performance and Benchmark Comparisons of Discretionary CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Discretionary Index	9.56%	5.82%	1.21	-3.82%	1.43	3.25
CASAM/CISDM CTA Equal Weighted Discretionary Index	9.85%	4.24%	1.73	-2.41%	0.24	-0.64
Barclay Trader Indexes Discretionary	5.95%	3.66%	0.94	-3.29%	0.22	1.38
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	NA	NA	NA	NA	NA	NA
MFSB Composite	NA	NA	NA	NA	NA	NA
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations					
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Discretionary Index
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Discretionary Index	0.08	0.13	0.05	0.34	0.28	1.00
CASAM/CISDM CTA Equal Weighted Discretionary Index	0.14	0.27	0.13	0.32	0.20	0.59
Barclay Trader Indexes Discretionary	0.27	-0.01	-0.02	0.07	0.16	0.34
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	NA	NA	NA	NA	NA	NA
MFSB Composite	NA	NA	NA	NA	NA	NA
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.19	-0.23	0.08
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.26	0.21	0.13
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.04	-0.21	0.05

	Benchmark (Excess Return) Comparison of Discretionary CTA Indices: 2001 - 9/2006					
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Discretionary Index
CASAM/CISDM CTA Asset Weighted Discretionary Index	7.06%	3.22%	5.15%	NA	NA	0.00%
CASAM/CISDM CTA Equal Weighted Discretionary Index	7.34%	4.54%	5.43%	NA	NA	0.28%
Barclay Trader Indexes Discretionary	3.45%	1.03%	1.53%	NA	NA	-3.62%

Exhibit 11b: Descriptive Statistics of Discretionary CTA Indices

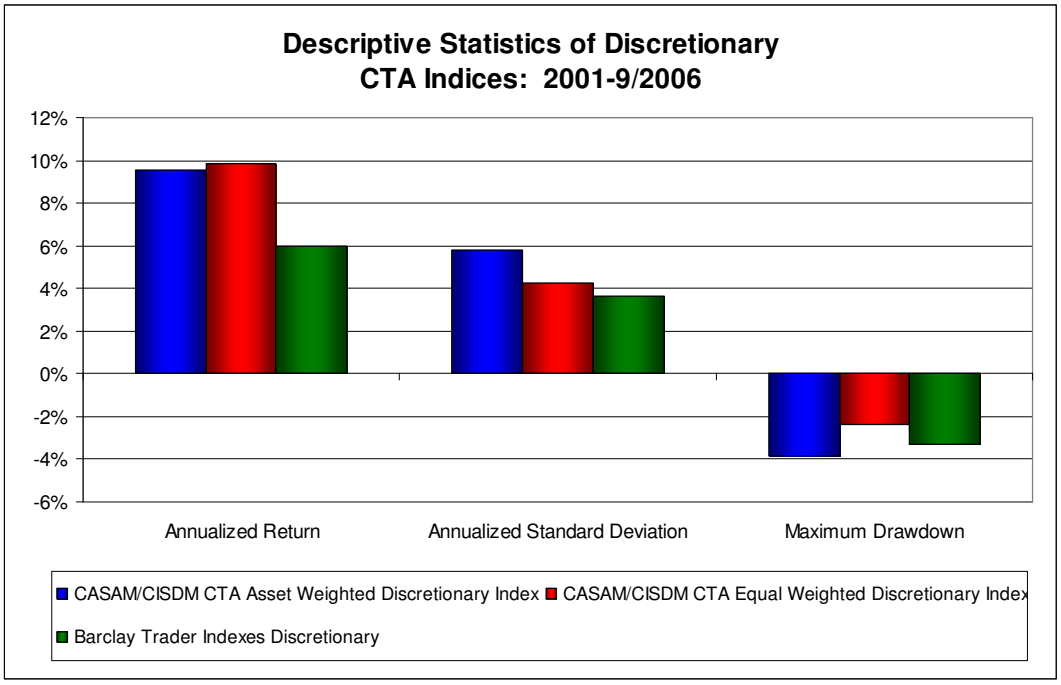


Exhibit 11c: Market Factor Correlations of Discretionary CTA Indices

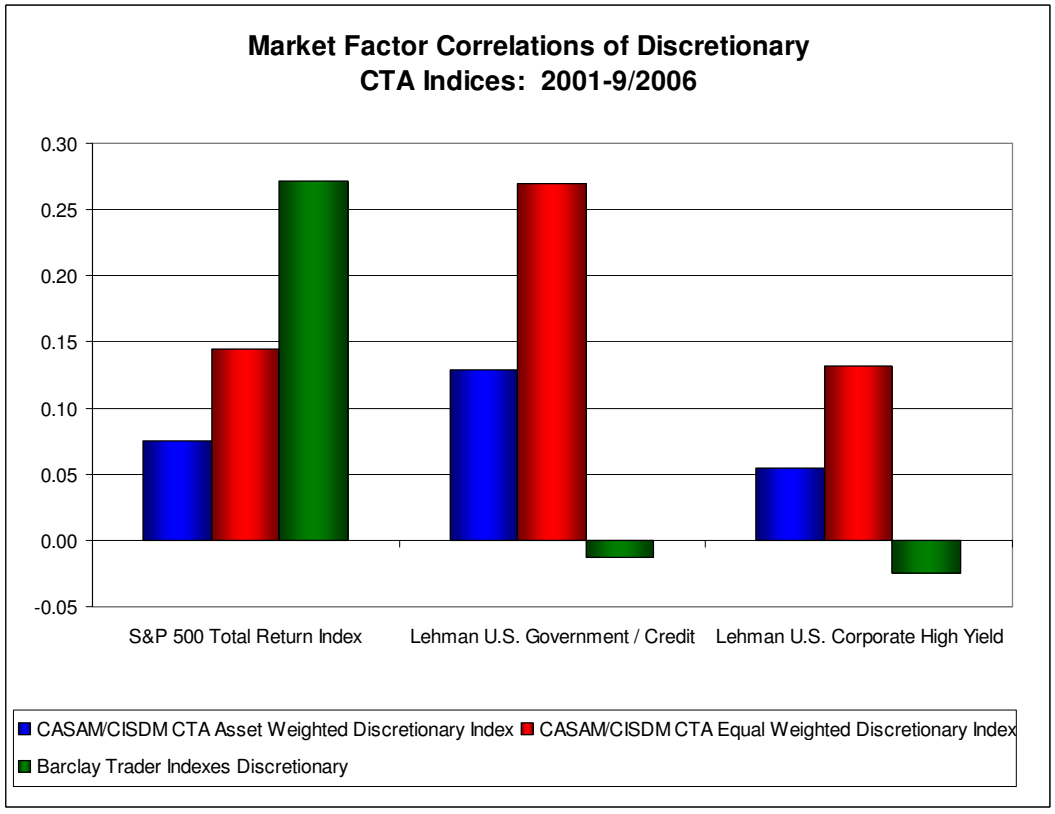


Exhibit 11d: Security and Market Based Correlations of Discretionary CTA Indices

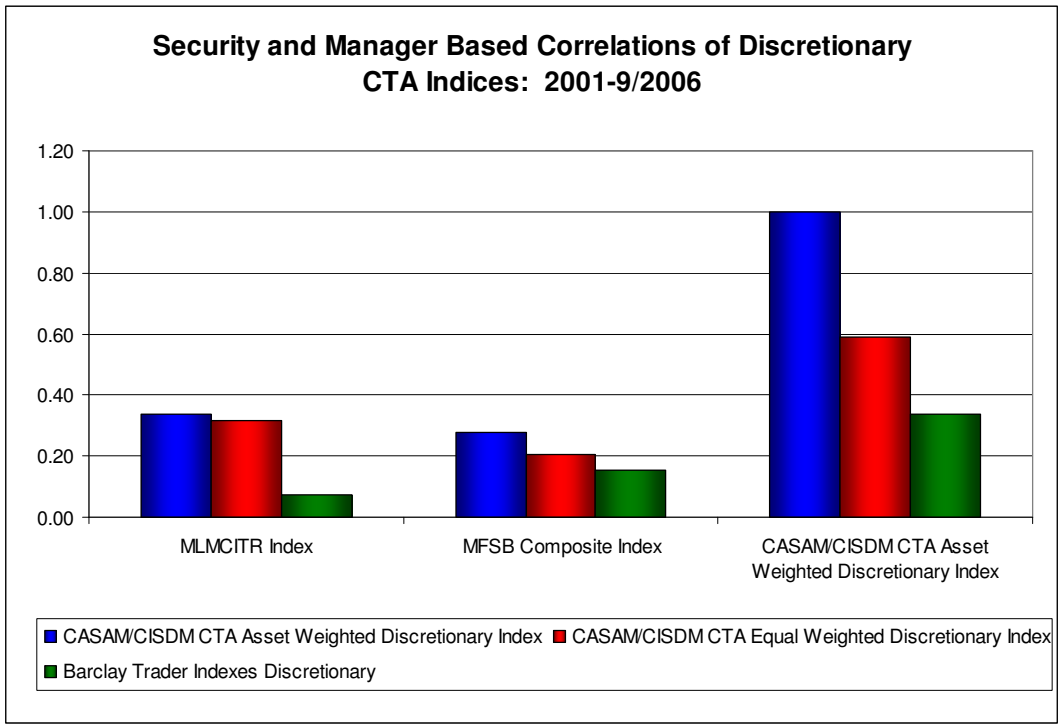
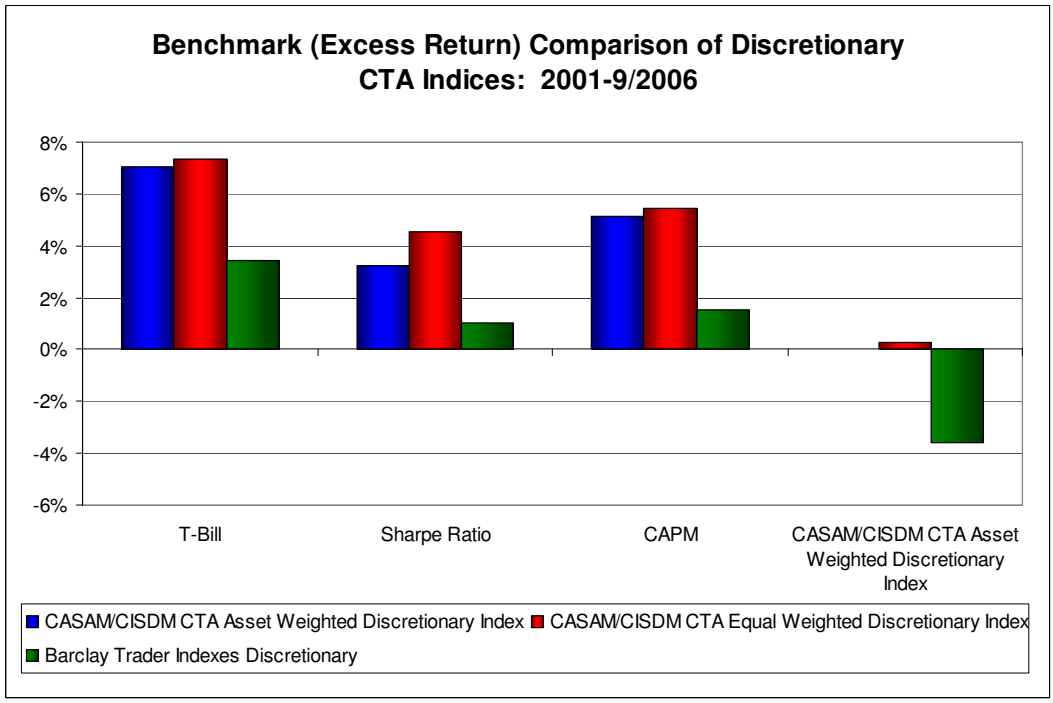


Exhibit 11e: Benchmark (Excess Return) Comparison of Discretionary CTA Indices



Systematic CTAs

Exhibit 12a shows the return performance, correlations, and benchmark comparisons of non-investible systematic CTA indices and investible composite CTA indices. Non-investible systematic CTA indices outperformed the MLM Composite CTA index with higher absolute and risk adjusted returns. In contrast, the MFSB Composite index had higher absolute returns, but similar risk-adjusted returns when compared relative to non-investible systematic indices.

Exhibit 12a: Performance and Benchmark Comparisons of Systematic CTA Indices

2001-9/2006	Annualized Return	Annualized Standard Deviation	Sharpe Ratio	Maximum Drawdown	Skewness	Kurtosis
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Systematic Index	5.34%	7.10%	0.40	-5.88%	0.01	-0.05
CASAM/CISDM CTA Equal Weighted Systematic Index	5.99%	9.05%	0.39	-9.91%	0.18	-0.37
Barclay Trader Indexes Systematic	4.27%	9.66%	0.18	-10.13%	0.10	-0.07
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	2.21%	6.35%	-0.05	-8.94%	0.33	2.41
MFSB Composite	5.50%	10.65%	0.28	-15.00%	0.07	1.37
S&P 500 Total Return Index	1.91%	14.10%	-0.04	-38.87%	-0.45	0.49
Lehman U.S. Government/Credit	5.78%	4.64%	0.71	-4.58%	-0.76	1.50
Lehman U.S. Corporate High Yield	8.99%	8.25%	0.79	-12.04%	-0.64	3.16

	Correlations					
2001-9/2006	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Systematic Index
Manager (Non-Investible)						
CASAM/CISDM CTA Asset Weighted Systematic Index	-0.12	0.36	-0.07	0.47	0.73	1.00
CASAM/CISDM CTA Equal Weighted Systematic Index	-0.26	0.33	-0.16	0.48	0.74	0.91
Barclay Trader Indexes Systematic	-0.28	0.36	-0.18	0.48	0.75	0.92
Manager (Investible)	NA	NA	NA	NA	NA	NA
Security (investible)						
MLMCITR Index	-0.19	0.26	-0.04	1.00	0.12	0.47
MFSB Composite	-0.23	0.21	-0.21	0.12	1.00	0.73
S&P 500 Total Return Index	1.00	-0.31	0.52	-0.19	-0.23	-0.12
Lehman U.S. Government/Credit	-0.31	1.00	0.13	0.26	0.21	0.36
Lehman U.S. Corporate High Yield	0.52	0.13	1.00	-0.04	-0.21	-0.07

	Benchmark (Excess Return) Comparison of Systematic CTA Indices: 2001 - 9/2006					
	Absolute Return Based	Total Risk Based	Market Factor Based	Security (Futures) Based	Security (Futures) Based	Manager Based - Non-Investible
Index	T-Bill	Sharpe Ratio	CAPM	MLMCITR Index	MFSB Composite Index	CASAM/CISDM CTA Asset Weighted Systematic Index
CASAM/CISDM CTA Asset Weighted Systematic Index	2.84%	-1.85%	0.93%	3.14%	-0.16%	0.00%
CASAM/CISDM CTA Equal Weighted Systematic Index	3.49%	-2.49%	1.57%	3.78%	0.49%	-0.41%
Barclay Trader Indexes Systematic	1.77%	-4.61%	-0.15%	2.06%	-1.23%	-2.13%

Exhibit 12b: Descriptive Statistics of Systematic CTA Indices

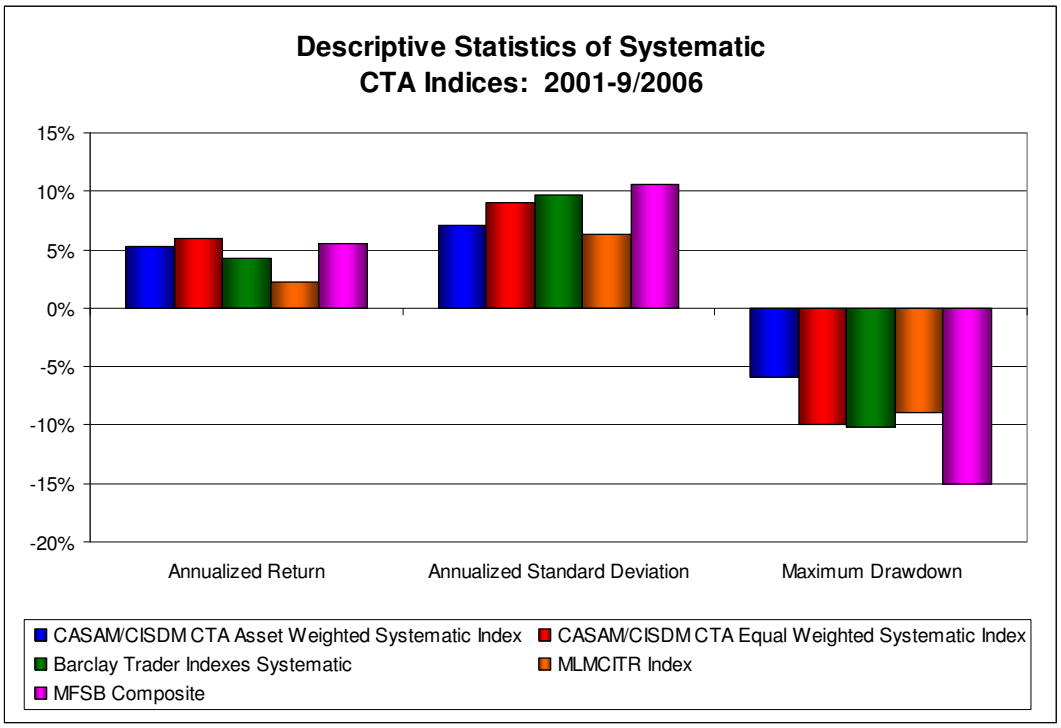


Exhibit 12c: Market Factor Correlations of Systematic CTA Indices

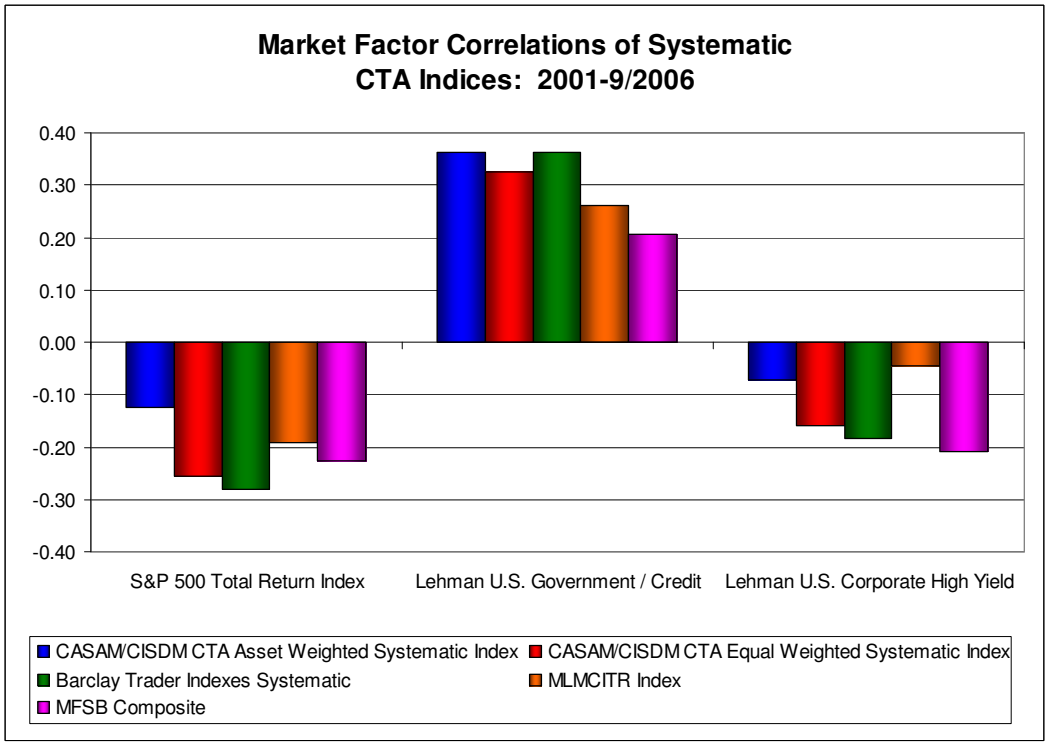


Exhibit 12d: Security and Manager Based Correlations of Systematic CTA Indices

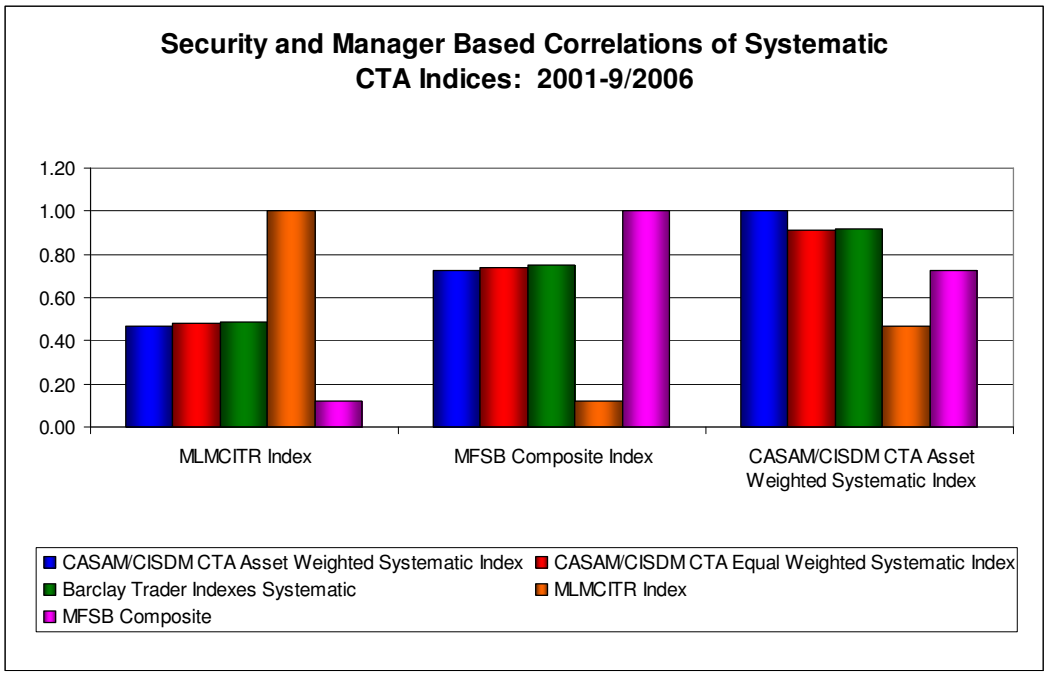
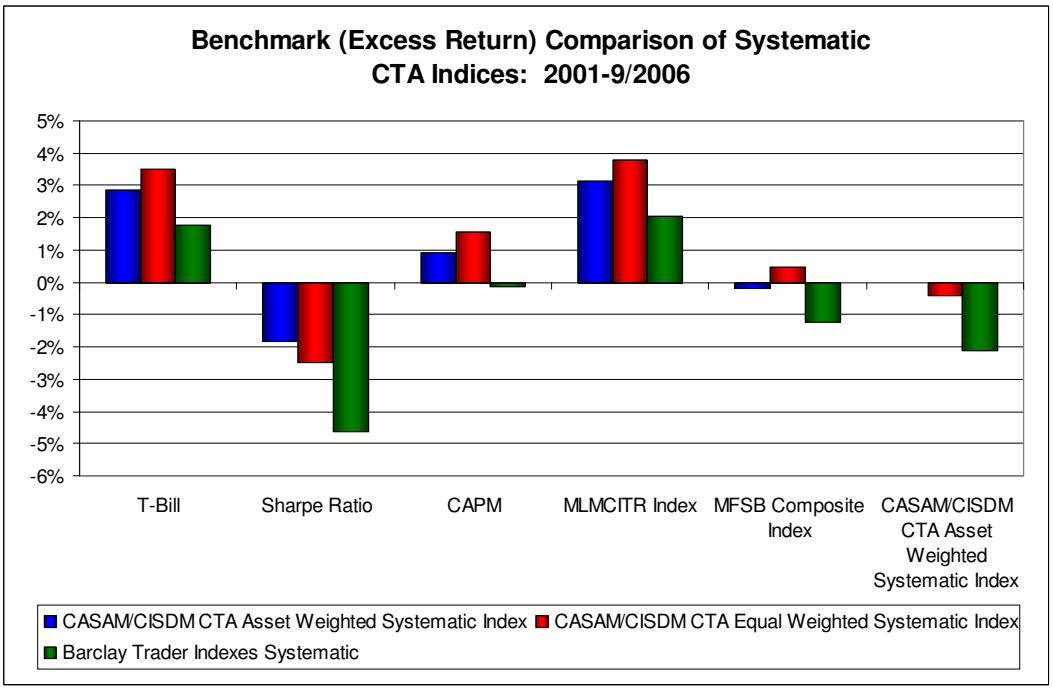


Exhibit 12e: Benchmark (Excess Return) Comparison of Systematic CTA Indices



All systematic CTA indices were found to have negative market factor correlations with the S&P 500 and Lehman U.S. Corporate High Yield Index and were positively correlated with the Lehman U.S. Government/Credit Index. Positive correlations are found between all systematic CTA indices and security and market based indices. Systematic CTA indices on average tend to be moderately correlated with the security based MLM and MFSB Composite indices with correlations of approximately 0.48 and 0.75, respectively. Such CTAs on average tend to have even higher correlations with the manager based CASAM/CISDM CTA Asset Weighted Systematic Index. Again, the results indicate the relative differences that exist between industry and market factor correlations among the various investible and non-investible indices.

Given the low correlation with the S&P 500, absolute return based (T-Bill) and market factor based (CAPM) excess returns metrics for non-investible systematic CTA indices are found to be somewhat similar. As in previous examples, using their corresponding expected Sharpe ratios as a benchmark, the excess returns were negative. Compared to manager based benchmark metrics, each of the non-investible systematic CTA indices incurred negative excess return estimates. Graphical representations of the results found in Exhibit 12a are presented in Exhibits 12b though 12e.

4.3 Average Manager Level Results

The previous section used existing CTA benchmarks as surrogates for CTA strategy based portfolios. In this section, a set of CTAs with full data over the period 2001-9/2006 are used. The performance, market correlations, and relative benchmark performance of each CTA is determined. Financial and diversified CTAs are used as a basis for reviewing the average performance, average market factor correlations, and average relative benchmark performance of the CTAs. As important, many CTAs use a variety of momentum models in determining trading strategies. Most current CTA benchmarks are not broken down into sub-samples based on the length of the period used in determining buy and sell recommendations. For instance, many CTAs, momentum models may be short-term (e.g., 7 days), mid-term (e.g., 15 days), or longer-term in nature (e.g., 30+ days). In the following exhibits we also depict the average performance of CTAs sampled categorized by their respective trading time frames. Lastly, both CASAM/CISDM indices and indices based on a portfolio of similar CTAs are created to provide a basis for a peer group benchmark. Note that in this analysis, a peer group benchmark is based on current CTAs reporting to the database, and as a result, contains considerable backfill bias. As such, the constructed CTA benchmark return estimates are upward biased. For more accurate peer group analysis, one should ensure that managers are reviewed that do not contain significant backfill bias.

Average Manager Level Comparison: Financial CTAs

Exhibit 13a shows the average performance of a portfolio financial CTAs sampled categorized by their respective trading time frames. In this example, financial CTAs with short trading time periods on average had considerably lower returns and less volatility than financial CTAs with long trading time periods. These short trading time period CTAs also, on average, had lower correlations with traditional financial CTA indices which are often used to represent their return. This indicates that for financial CTAs in general (as well in other CTA strategies) for the purposes of peer group and other comparisons, the underlying 'trading time frame' focus of the strategy must be considered to provide a better basis for CTA comparison. Graphical representations of the results found in Exhibit 13a are presented in Exhibits 13b though 13e.

Exhibit 13a: Average Performance Portfolio Level Comparison: Financial CTAs

Average Performance of Financial CTAs: 2001 - 9/2006						
Time Period	Average Annualized Return	Average Annualized Standard Deviation	Average Sharpe Ratio	Average Maximum Drawdown	Average Skewness	Average Kurtosis
All	4.58%	21.80%	0.12	-28.54%	0.27	0.54
Short	4.05%	11.81%	0.08	-17.65%	0.40	1.33
Multiple	3.99%	19.72%	0.08	-25.21%	-0.14	0.44
Medium	2.47%	33.80%	0.00	-41.30%	0.10	-0.12
Long	5.33%	23.81%	0.16	-31.01%	0.33	0.38

Average Correlations of Financial CTAs: 2001 - 9/2006							
Time Period	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index	CASAM/CISDM CTA Asset Weighted Financial Index	MFSB Financial Index
All	-0.30	0.28	-0.20	0.73	0.72	0.71	0.46
Short	-0.28	0.17	-0.21	0.41	0.38	0.46	0.37
Multiple	-0.35	0.30	-0.26	0.85	0.89	0.77	0.42
Medium	-0.43	0.36	-0.23	0.79	0.83	0.80	0.68
Long	-0.27	0.31	-0.18	0.82	0.80	0.79	0.46

Benchmark (Excess Return) Comparison of Financial CTAs: 2001 - 9/2006							
Time Period	T-Bill	CAPM	Sharpe Ratio	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index	CASAM/CISDM CTA Asset Weighted Financial Index	MFSB Financial Index
All	2.07%	0.16%	-0.12	-1.96%	0.15%	-5.74%	-1.44%
Short	1.54%	-0.37%	-0.06	-2.48%	-0.38%	-6.27%	-1.97%
Multiple	1.49%	-0.42%	-0.12	-2.54%	-0.43%	-6.33%	-2.03%
Medium	-0.03%	-1.95%	-0.22	-4.06%	-1.96%	-7.85%	-3.55%
Long	2.82%	0.91%	-0.13	-1.21%	0.90%	-4.99%	-0.69%

Exhibit 13b: Descriptive Statistics (Average) of Financial CTA Managers

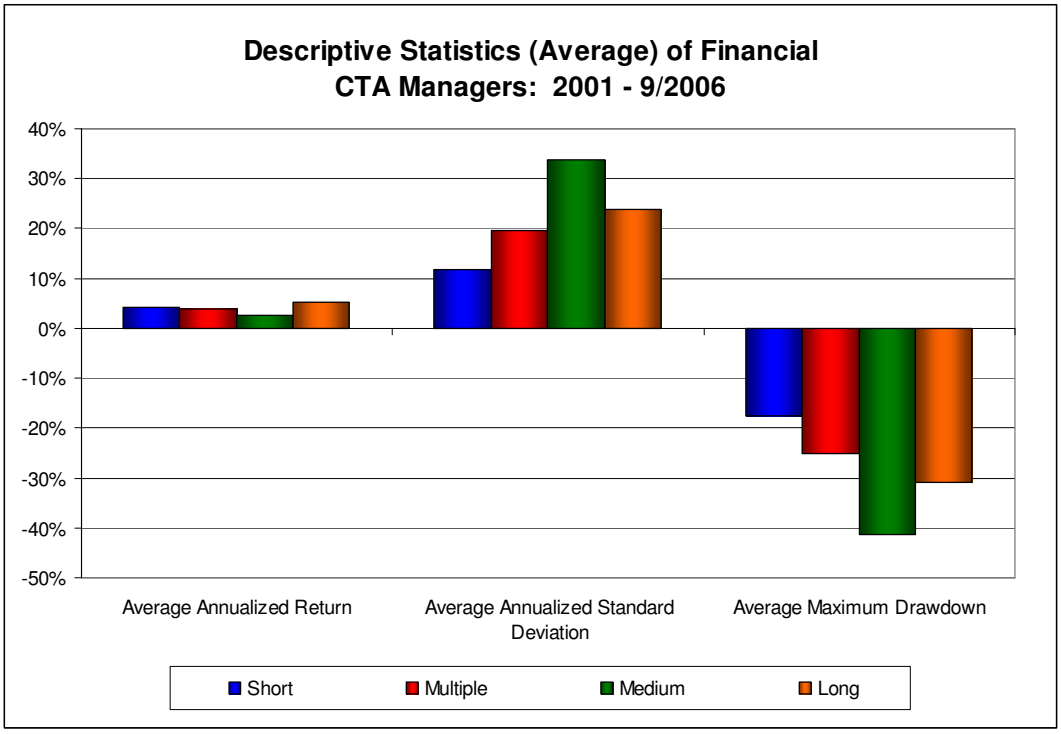


Exhibit 13c: Market Factor Correlations (Average) of Financial CTA Managers

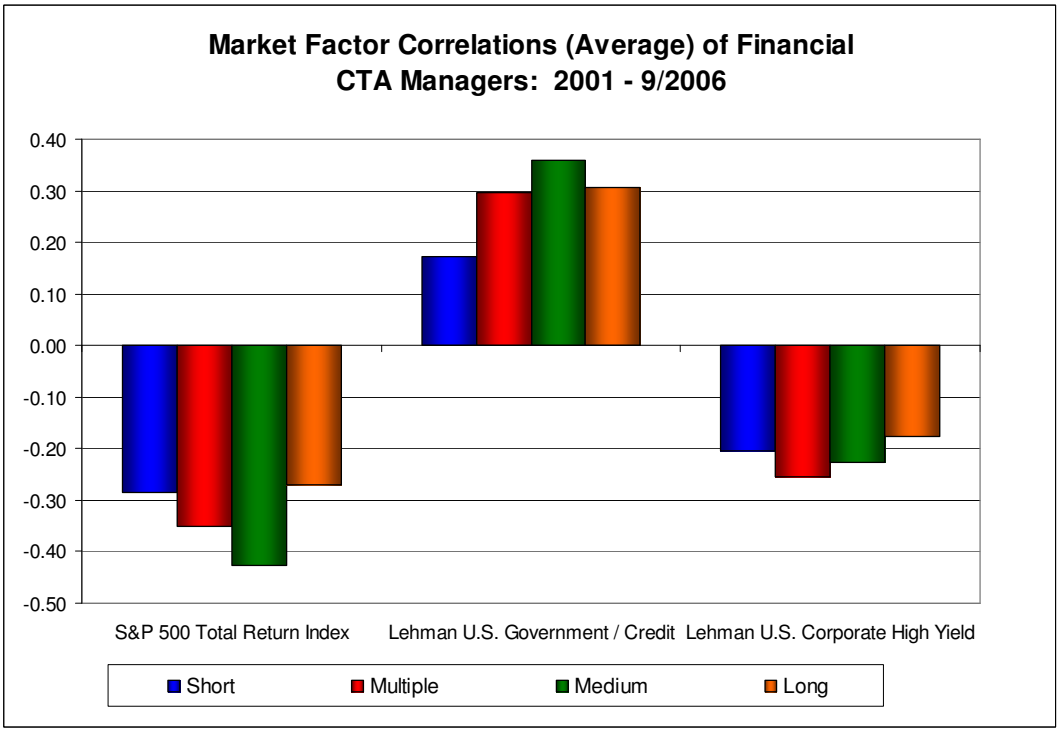


Exhibit 13d: Security and Manager Based Correlations (Average) of Financial CTA Managers

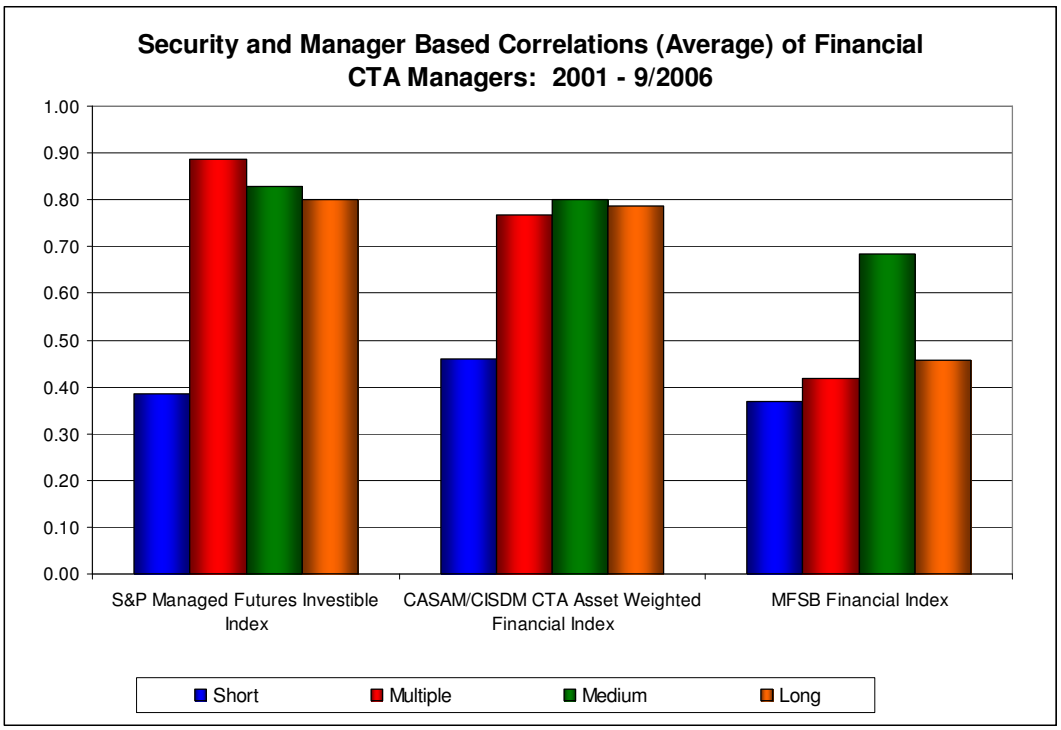
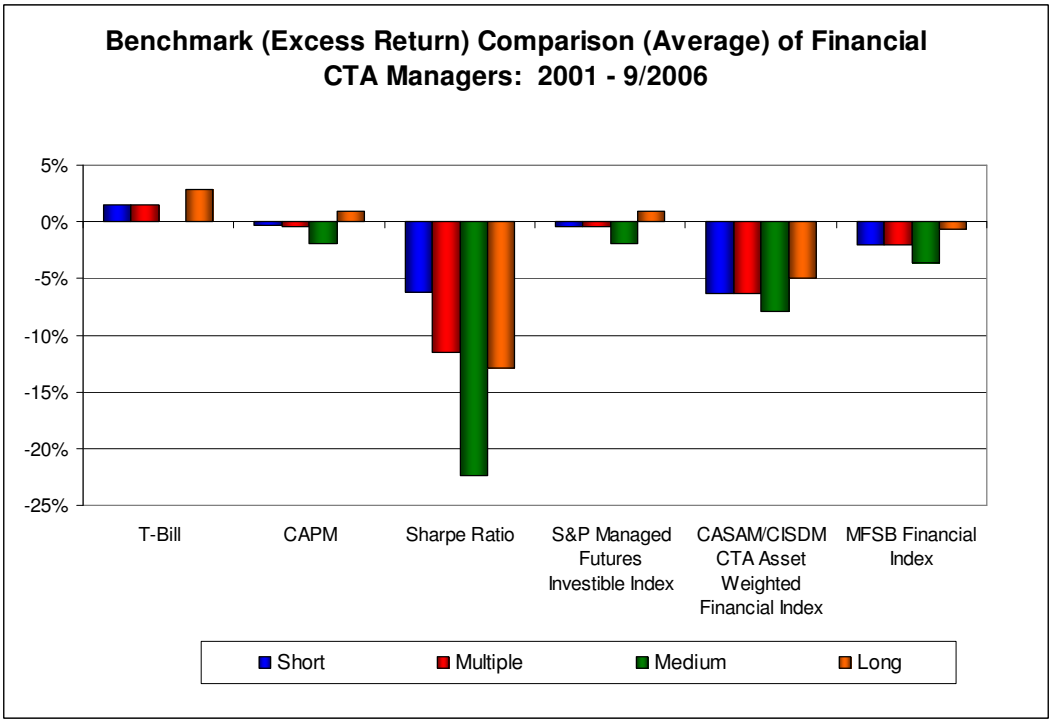


Exhibit 13e: Benchmark (Excess Return) Comparison (Average) of Financial CTA Managers



Average Manager Level Comparison: Diversified CTAs

In the previous section we concentrated on examining the characteristics of a portfolio of CTAs by trading time. Exhibit 14a shows the average performance of diversified CTAs sampled categorized by their respective trading time frames. As shown previously, diversified CTAs with short trading time periods on average had considerably lower returns and less volatility. Moreover, CTAs with short trading time periods had lower correlations with most market factors, as well as CTA indices with managers whose strategy was more longer term in nature. However, risk-adjusted returns were greater for CTAs with long time frames. Diversified CTAs also had similarly negative correlations with U.S. equity and high yield debt indices regardless of their time periods.

Exhibit 14a: Average Performance and Benchmark Comparison of Diversified CTA s

Average Performance of Diversified CTAs: 2001 - 9/2006

Time Period	Average Annualized Return	Average Annualized Standard Deviation	Average Sharpe Ratio	Average Maximum Drawdown	Average Skewness	Average Kurtosis
All	9.52%	20.31%	0.36	-23.87%	0.21	0.51
Short	3.66%	7.95%	0.26	-11.75%	0.30	1.63
Multiple	9.35%	17.74%	0.40	-20.30%	0.27	0.25
Medium	8.55%	21.21%	0.32	-25.29%	0.17	0.45
Long	12.62%	26.19%	0.40	-30.31%	0.22	0.51

Average Correlations of Diversified CTAs: 2001 - 9/2006

Time Period	S&P 500 Total Return Index	Lehman U.S. Government / Credit	Lehman U.S. Corporate High Yield	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index	CASAM/CISDM CTA Asset Weighted Diversified Index	MFSB Composite Index
All	-0.20	0.23	-0.14	0.67	0.69	0.69	0.52
Short	-0.19	0.13	-0.18	0.38	0.41	0.39	0.49
Multiple	-0.20	0.31	-0.11	0.71	0.73	0.73	0.58
Medium	-0.15	0.15	-0.11	0.65	0.66	0.67	0.48
Long	-0.26	0.27	-0.17	0.74	0.75	0.77	0.52

Benchmark (Excess Return) Comparison of Diversified CTAs: 2001 - 9/2006

Time Period	T-Bill	CAPM	Sharpe Ratio	CASAM/CISDM CTA Asset Weighted Index	S&P Managed Futures Investible Index	CASAM/CISDM CTA Asset Weighted Diversified Index	MFSB Composite Index
All	7.01%	5.10%	-0.06	2.99%	5.09%	3.83%	4.01%
Short	1.15%	-0.76%	-0.04	-2.88%	-0.77%	-2.03%	-1.85%
Multiple	6.85%	4.93%	-0.05	2.82%	4.92%	3.67%	3.85%
Medium	6.05%	4.13%	-0.08	2.02%	4.12%	2.86%	3.05%
Long	10.12%	8.20%	-0.07	6.09%	8.19%	6.94%	7.12%

Exhibit 14a also shows the comparison of diversified CTAs sampled measured against various benchmark metrics when such CTAs are separated based on their time periods. The excess return estimates of diversified CTAs for each time period varies depending on the benchmark used. In this case however, while the short trading period CTAs have the lowest zero risk excess return and CAPM return, their Sharpe based return comparisons are similar to other managers. This is consistent with their overall lower volatility. Likewise their average peer group and futures based index comparisons returns are less than their comparable longer trading time managers. As discussed previously, comparing managers with different trading focuses can lead investors to improper comparisons. Graphical representations of the results found in Exhibit 14a are presented in Exhibits 14b though 14e.

Exhibit 14b: Descriptive Statistics (Average) of Diversified CTA Managers

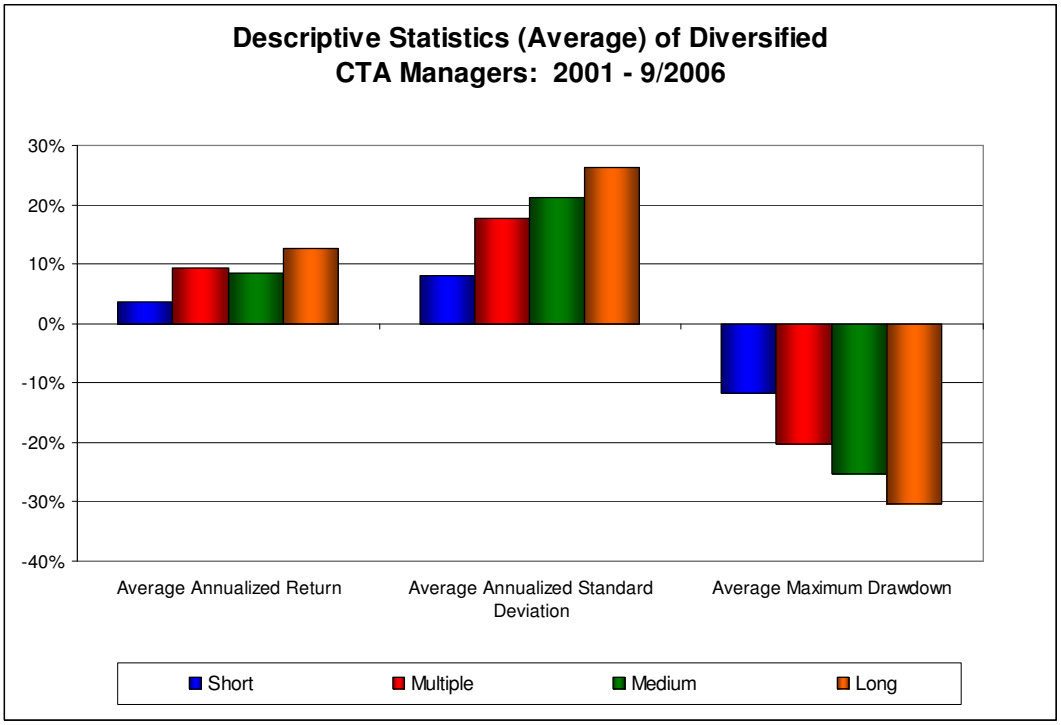


Exhibit 14c: Market Factor Correlations (Average) of Diversified CTA Managers

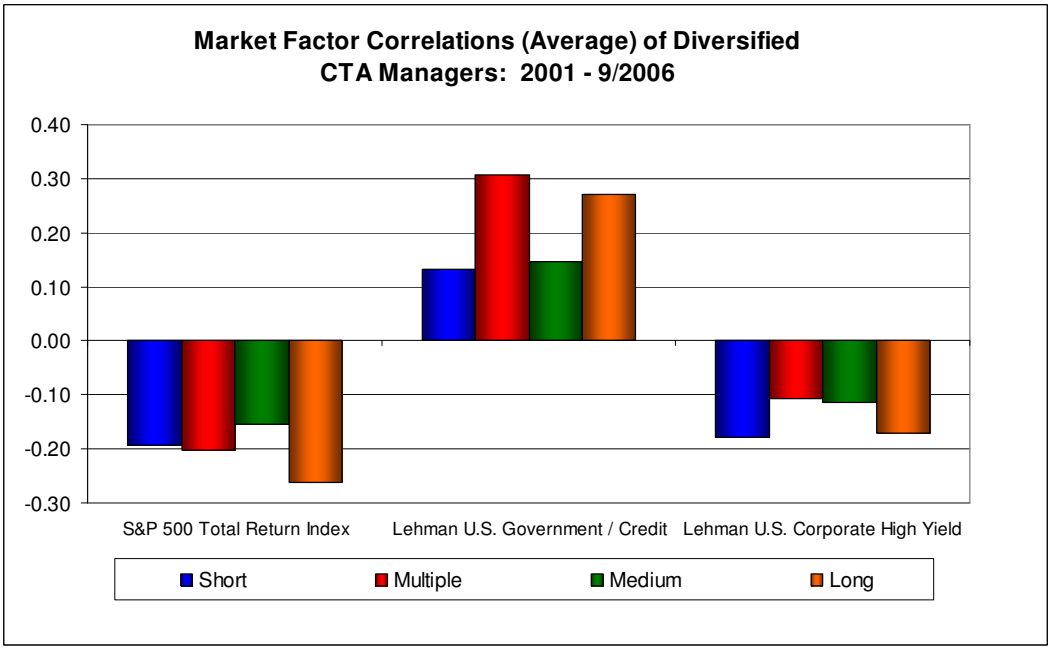


Exhibit 14d: Security and Manager Based Correlations (Average) of Diversified CTA Managers

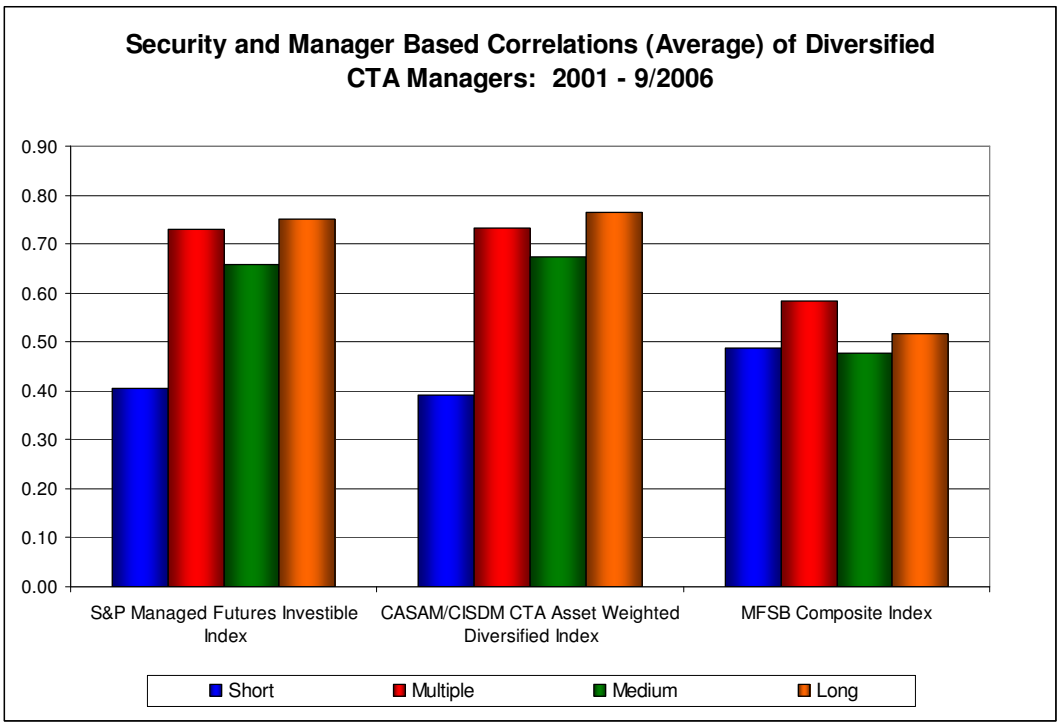
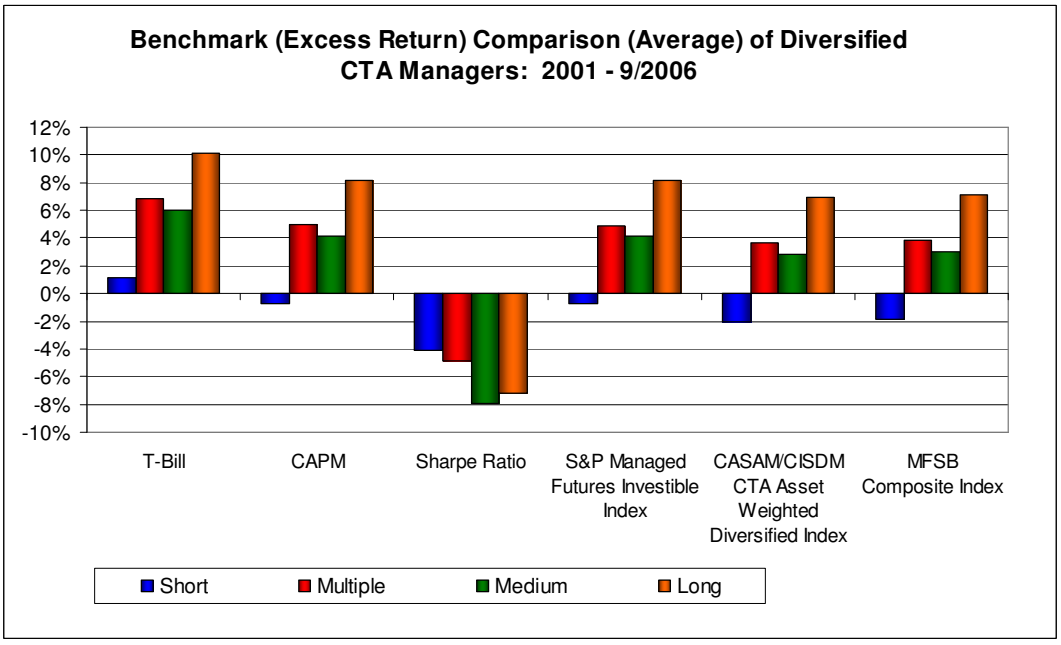


Exhibit 14e: Benchmark (Excess Return) Comparison (Average) of Diversified CTA Managers



5. Issues in Performance Measurement

The results in the previous sections provide a 'half full' or 'half empty' view of CTA benchmark creation and performance measurement. Historically, CTA returns have often been compared to T-Bill returns since CTA have been shown to have a low correlation to equity markets (low beta) and therefore on a CAPM basis, the risk free rate may be regarded as a 'CAPM' based return alternative. For others, since futures require only margin, the investible alternative is often Treasury bills. To the degree that CTAs offer a positive 'traders' return that return would be in excess of the Treasury Bill return.

Modern asset theory, however, now views required asset return as a function of a wider range of potential return to risk tradeoffs. Risk is often described as either total risk (as expressed by standard deviation and the traditional Sharpe ratio) or market risk (as described by the CAPM). However, Treasury bill, beta adjusted, or total risk based return comparisons fail to provide an estimate of the true 'alpha'. Measurement of alpha requires that the comparison asset be investible and reflect the underlying strategy and risks of the comparison asset. As such, passive security (futures) based strategy replicates may be one means of measuring manager based skill above the returns inherent in the underlying strategy and the resultant 'manager alpha'. Given the issues involved in absolute, market or passive index performance comparison, peer group comparison remains at the heart of CTA analysis although it fails to provide an estimate of absolute manager skill. Even in this case, most peer group comparisons often fail to provide adequate comparisons. To be truly comparable, the peer CTAs must use similar 'trading time' decision rules to the comparison CTA managers.

In this short synopsis it is impossible to detail all the research related to CTA benchmark performance comparison. Issues of concern not directly addressed in this analysis include the problems of survivor and backfill bias when one creates comparison 'in house' peer group benchmarks from current data bases. Unless one has a set of historical data basis from which to create similar size, age, and other manager characteristic based portfolios, new listed managers and peer groups based off of them will have a return advantage over older managers who have remained in data bases over a number of years. Lastly, research has shown that used of commonly available indices differ in a number of design areas. Some indices are asset weighted, or equal weighted. Some indices rebalanced monthly others annually. These differences can result in major differences in seemingly similar strategy indices. Unless rebalanced relatively often, an index may become overweighted to certain CTAs or CTA groups. Moreover, some CTAs have higher volatility than other CTAs in the same strategy grouping. Regardless of the number of managers in an index, the most volatile managers will have a relatively greater impact on the return process. Few if any CTAs indices volatility adjust among representative managers.

It is obvious that while problems related to CTA benchmark performance exist, few if any existing benchmarks or indices have attempted to correct these problems. However, with greater competition among index provides as well as consultants, one may anticipate that a number of additional methodologies will be proposed that provide adequate peer analysis and manager skill appraisal.

6. Conclusion

While academic research has centered primarily on the benefits of managed futures, less work exists on determining the relative performance benefits of individual CTAs or CTA strategies. One reason for the lack of research in this area is that traditional multi-factor benchmark models which are used to describe the market factors driving traditional stock and bond as well as many hedge fund strategies have little use in describing the return behavior of CTAs. This is mainly due to the underlying strategy focus of CTAs results in investment holdings which do not traditionally benchmark long only stock and bond indices. In fact, managed futures were once described principally as absolute return strategies since there goal was to obtain positive returns across a variety of markets. This approach often led to a low exposure to traditional equity benchmarks (zero beta) and as a result, relative performance was often measured in comparison to the risk free rate. Today, it is well understood that managed futures require a broader understanding of the underlying risk structure of the strategy and that a range of benchmarking alternatives may be used to provide an understanding of the underlying returns to a CTA strategy and its performance relative to similar strategies. In this paper we provide: 1) a brief synopsis of the benefits of managed futures investment; 2) a short review of manager based CTA benchmark construction; and 3) an empirical analysis on the relative performance of various CTA benchmarks (non-investible manager based indices, investible manager based indices, and passive security based indices). The various CTA indices are also compared on a zero risk (e.g., Treasury Bill), total risk (Sharpe Ratio), market factor risk (e.g., S&P 500) and strategy risk (e.g., passive futures based CTA index) and peer group basis (investible and non-investible manager based indices). Lastly, for a selected set of CTAs with full data over the period of analysis an example of the use of various CTA benchmarks in determining excess peer group return, and zero risk, total risk, market risk or strategy (futures based) risk excess return is provided.

Results show that the various manager and security based indices have similar exposure to market factors as well as moderate intra-strategy correlations. However, results also indicate differences in benchmark return among the various investible and non-investible indices as well as between various risk-based measures of expected return. In short, results indicate both the potential use of various benchmarks to capture underlying return process yet the necessity of understanding the structure and return process embedded in each benchmarking approach.

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